OCTOBER 11, 1954

NEWS ISSUE

Electrical World

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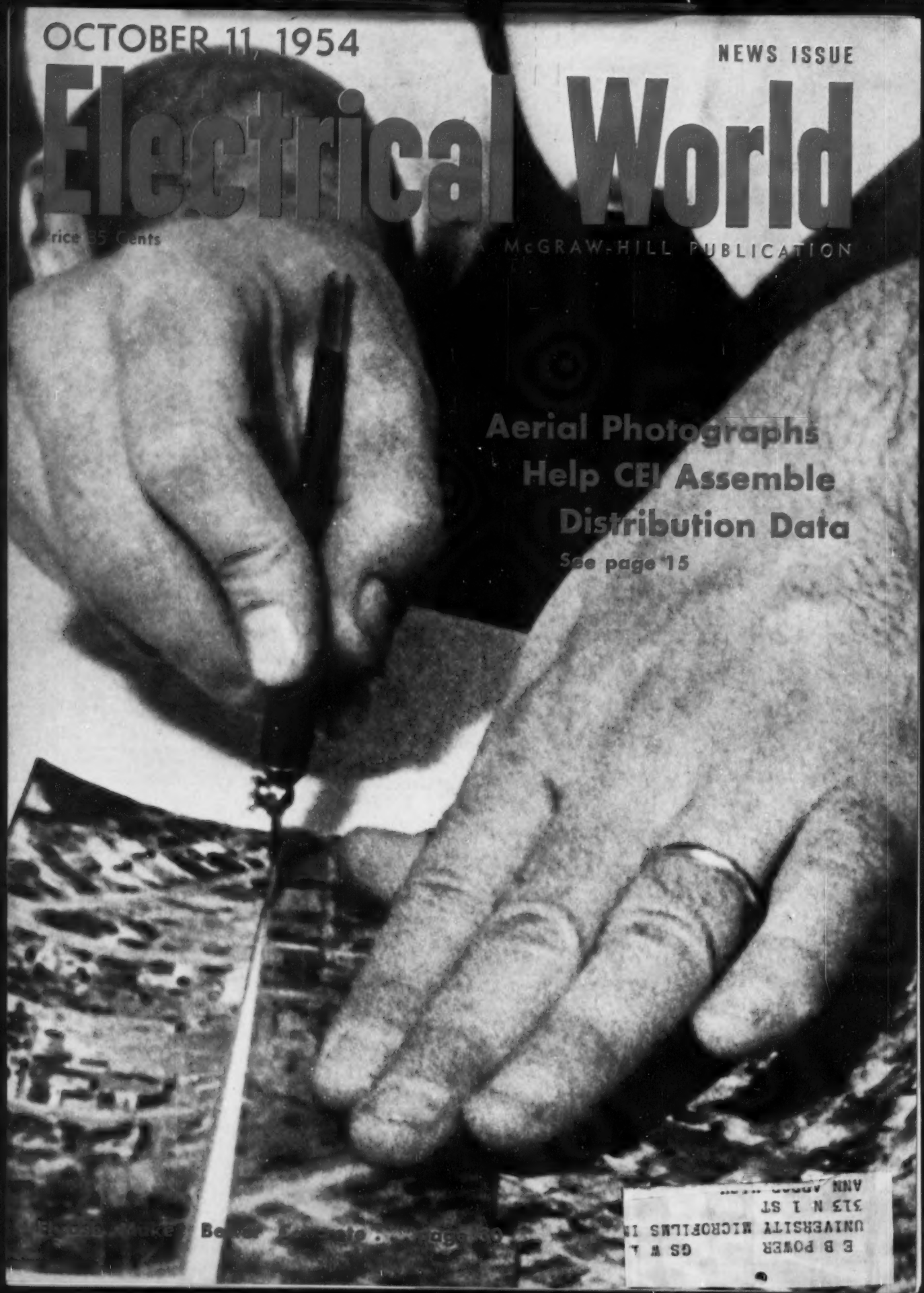

Aerial Photographs Help CEI Assemble Distribution Data

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MORE POWER TO AMERICA AWARD recognizes outstanding industrial electrification. Shown (left to right) at last year's presentation are: Harry Restofski, chairman EEI Awards Committee, winners Douglas B. McGregor, Arizona Public Service Co., J. F. Gaskill, Philadelphia Electric Co., and Karl Runckle, General Electric Co.

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MORE POWER TO AMERICA

GENERAL ELECTRIC

Electrical World

Vol. 142 No. 15 October 11, 1954

Published for 80 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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ELECTRICAL WORLD

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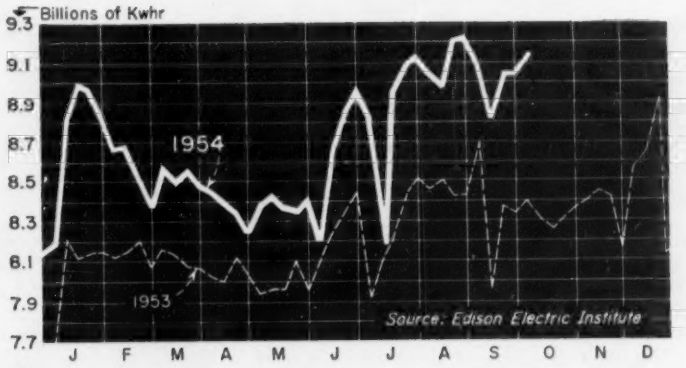


Output Week Ended Oct. 2—9,158,000,000 Kwhr

Per Cent Change from Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Oct. 2	+8.8	+0.1	+3.7	+2.0	+4.0	+22.5	+12.3	−2.9	+4.4	+9.1
Sept. 25	+8.6	−0.4	+3.8	+0.7	+5.8	+19.7	+19.5	−1.5	+5.3	+7.2
Sept. 18	+8.1	−0.4	+5.4	+1.8	+4.6	+19.3	+13.5	−2.7	+6.3	+1.1

Seasonally Adjusted Index †174.8 Week Ago 173.0 Year Ago 160.7

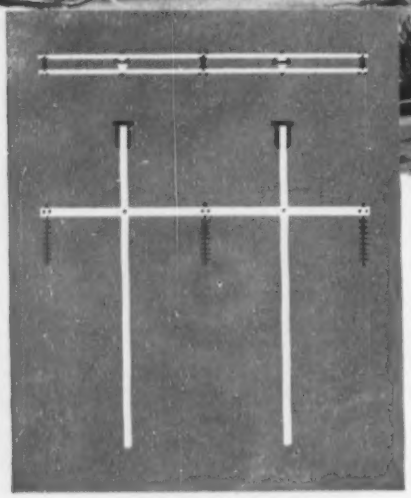
Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load ‡(Million Kw)	June	78.0	74.0	73.0
Capacity (Million Kw)	Aug.	98.08	96.98	86.63
Production (Billion Kwhr)	July	40.08	38.90	38.03
Hydro	July	8.76	9.59	8.75
Fuel	July	31.32	29.31	29.28
Fuel Consumption:				
Coal (Million Tons)	July	9.40	9.29	9.59
Oil (Million Barrels)	July	4.45	4.29	6.34
Gas (Billion Cu Ft)	July	113.20	107.79	109.35
Sales (Billion Kwhr)	July	32.99	32.57	32.13
Residential	July	9.50	9.32	8.47
Commercial	July	6.52	6.04	5.81
Industrial	July	14.35	14.85	15.50
Other	July	2.62	2.36	2.35
Net Income Class A & B Companies ($ Million)	July	84.47	86.76	73.12
Estimated Dec. '54 Peak ‡(Million Kw)	July	88.1	88.1	91.9
Kwhr per Residential Customer (12 Month Average)	July	2,458	2,441	2,272
Revenue per Kwhr Residential Service (12 Month Average)	July	2.71¢	2.71¢	2.75¢
Canadian Production (Billion Kwhr)	June	5.67	5.93	5.26

Business Statistics

FRB Industrial Production Index†	Aug.	124*	116	136
Gross National Product Annual Rate ($ Billion)	2nd Qtr.	356.0	355.8	369.9
EW 4 Industry Production Index†	Aug.	114.9	114.2	125.8
ENR Construction Cost Index†	July	135.0	130.5	126.6
BLS Consumer's Price Index	Aug.	115.0	115.2	115.0
NEMA Insulation Materials Sales Index†	July	92	124	150
NEMA Electric Appliance Sales Index†	July	88	102	86
NEMA Household Refrig. Sales Index†	July	93	82	87

* Preliminary ** Revised ‡ Class 1 Systems † 1947-49=100 †† 1949=100



Type No. 700
Tangent Structure
for voltages 69 to 154 KV*

LIST OF MATERIAL

Quantity	Description
2	Crossarm
3	Steel spacer fitting w/mounting bolts
2	Stud bolt ⅞" w/2 washer nuts
4	MF locknut ⅞"
2	Static wire support
4	Machine bolt ⅝" w/locknut
2	Clevis
2	Suspension clamp for static wire
as req'd	Suspension insulator and fitting

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THE ELECTRICAL WEEK

News Highlights . . . Congressional Joint Committee on Atomic Energy is set to meet Oct. 13 on the AEC-Dixon-Yates contract. Executive agencies cleared the contract last week and asked the Congressional committee to waive the required waiting period.

Meanwhile the Senate anti-monopoly subcommittee continued to hear testimony from J. D. Stietenroth against middle South Utilities and Mississippi P&L. The former utility executive said he had agreed to appear at the hearing only after considerable pressure had been put on him by the subcommittee and other interests. He also said he filed away a memorandum of complaints to Rex I. Brown, then president of Mississippi P&L in January, 1952, because he needed his job at that time and wanted to clean up the situation. Earlier story is on page 5.

Investigation of the cause of the failure of 150,000-kw generator at Cromby Station continues.

Eisenhower denies NRECA charges that Administration is cutting down on rural electrification program.

Group of 13 industrialists and financial people have retained Robert LeBaron, who resigned recently as Deputy Secretary of Defense for Atomic Energy, to study investment possibilities of atomic energy under provisions of the revised Atomic Energy Act.

More than 700,000 new well-lighted classrooms will be needed in U. S. during next five years, William V. O'Brien, GE vice president told AIEE Middle Eastern District members in Reading, Pa.

A new battery has been announced by Dr J. J. Burbage, director of Mound Laboratory, Miamisburg, Ohio. Laboratory is operated by Monsanto Chemical Co for AEC. Battery makes use of a thermopile (a series of thermocouples) which converts heat from radioactive decay into electricity.

Present laws, placed on statute books over past several decades by scheming of professional federal government power proponents, are skillfully directed towards forcing of private capital sooner or later to withdraw from power field, and eventual national socialization. EEI's Pres Harold Quinton, told Indiana Electric Association.

Hells Canyon proceedings open again today, Oct. 11. Briefs are due then at FPC. These will be followed later by rebuttal briefs from all concerned.

Puget Sound P&L has sold $25 million 3½% first mortgage bonds due 1984 privately. It will soon sell another $25 million bonds to finance construction . . . Upper Peninsula Power will pay Nov. 1 a quarterly common stock dividend of 35¢ a share as compared with 30¢ previously.

Off the Washington Wire . . . Georgia co-ops have been turned down cold again on their proposal to buy Clark Hill power. Georgia Electric Membership Corp, representing 23 member co-ops who have offered to make a wheeling agreement for power, renewed its request for acceptance of the proposal recently in a letter to the Interior Department. Assistant Secretary Fred G. Aandahl replied, telling the co-op group Interior "cannot act affirmatively" on the proposal "until you can work out some plan whereby you can collect money to make payment to the government" and "establish your ability to firm it." Co-op spokesmen termed his attitude as "telling us to do something with power we don't have and which they won't give us." Aandahl said Interior is "doing everything possible" and "trying to keep the thing out of politics."

Brig Gen William E. Potter and Brig Gen Charles G. Holle of the Army Corps of Engineers have been appointed to Mississippi River Commission. Potter is Missouri River Division engineer, with headquarters at Omaha. Holle is South Atlantic Division chief, at Atlanta.

Bureau of Reclamation will join Santa Barbara County Water Agency in a $100,000 investigation to develop a water development plan for Upper Santa Ynez River Basin, Calif. Project constitutes a study of potential extensions of Cachuma Project, now being built by the bureau.

Michigan may have an atomic power plant within next five years, Detroit Edison's Pres Walker Cisler declared. He said that by 1964 energy from this plant will be made as cheaply as current now generated in coal-fired power plants.

Shawinigan W&P is buying Brown Corp's half interest in capital stock of St Maurice Power Corp, which owns a hydro station at La Tuque, Que. Shawinigan now has a half interest in corporation.

Arkansas cities of Russellville, Helena, and Marianna are studying plans to buy distribution systems now serving them. Russellville is served by Arkansas P&L and Helena and Marianna systems are owned by Arkansas Utilities Co and leased to Arkansas P&L.

Mississippi P&L appointed W. I. Hill chief financial officer to succeed J. D. Stietenroth, ousted secretary-treasurer of Middle South subsidiary.

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SENATE SUBCOMMITTEE listens to testimony of J. D. Stietenroth, right, at a hearing on his charges that Mississippi P&L is "Wall Street dominated." Sen William Langer, second from right, Sen Estes Kefauver, second from left, conducted hearing. At left is Sen John M. Butler, who unsuccessfully sought a voice in the proceedings. To right of Kefauver is Sidney Davis, committee counsel

Stietenroth Airs Charges at Hearing

The charges of J. D. Stietenroth, ousted financial officer of the Mississippi Power & Light Co, are now just about all in. Last week, he was still being questioned by a Congressional subcommittee dominated by two pro-public power members, both of whom have been outspoken in their criticism of the Administration's Dixon-Yates proposal.

This plan calls for a private utility group, composed of Middle South Utilities, Inc, and Southern Co, to build a 650,000-kw plant at West Memphis, Ark., and sell power to Atomic Energy Commission to replace power Tennessee Valley Authority now supplies AEC.

Officials of Mississippi P&L or Middle South, its parent company, still have not been called to give their side of the Stietenroth incident.

Stietenroth was relieved Sept. 19 from his long-time job as secretary-treasurer of Mississippi P&L after he released a violent statement contending Middle South was charging all the traffic would bear for its electric energy in Mississippi so as to subsidize the rest of Middle South's system. He was grabbed almost immediately by the Congressional public power bloc and put on the stand before Republican Sen William Langer's anti-monopoly subcommittee. There for almost a week he elaborated on his original charges (EW, Sept. 27, p 7) and then added some details.

Other developments in a week highlighting much activity surrounding the Dixon-Yates controversy included:

- Federal Power Commission announced it had already instituted an investigation of Mississippi P&L's books at Jackson, Miss., on the basis of Stietenroth's charges. It said Charles W. Smith, chief of the commission's bureau of accounts, finance, and rates would supervise the study. FPC said a preliminary study had not shown evidence of Mississippi P&L or Middle South violations of the law.
- Edgar H. Dixon, Middle South president, said "it is always a sad and regrettable experience" when "one does not measure up," and called on Stietenroth to institute legal proceedings if he has "any knowledge or evidence of wrongdoing." He said he would not dignify any of the charges by commenting on them.
- Mississippi P&L Chairman Rex I. Brown said, "I have read a substantial part of the hearing record and most of the (Stietenroth) testimony is a misrepresentation of the facts about our company and its policies.
- Sen Estes Kefauver (D-Tenn.), a member of the anti-monopoly subcommittee, said he had sent copies of the Stietenroth testimony to the Attorney General and to Stanley Barnes, head of the Justice Department's Antitrust Division, for investigation as to possible violations of the law.

Whether the former Mississippi P&L officer's testimony will be borne out by Langer's study, or whether FPC and possibly other agencies will uncover evidence of wrongdoing remain to be seen. However, the Stietenroth eruption from deep in the Dixon-Yates territory has brought up these possibilities:

- A rough blow to the proposed Dixon-Yates contract. Speculation is that perhaps the Eisenhower Administration now might prefer to await the results of the FPC investigation of Middle South's books in order to avoid the charge that it culminated an arrangement with a utility which had a questionable financial structure.

If this should happen, and the Democrats should win the fall elections and take control of Congress, the Dixon-Yates contract would face an overwhelming obstacle, as would

the entire Eisenhower power policy.

• A full-scale Congressional investigation of the entire public utilities field. Kefauver,. a TVA area public power advocate, has demanded that the Dixon-Yates contract be held up and that Congress initiate a utilities investigation next year. Rep Emanuel Celler (D-N. Y.), who would assume chairmanship of the House Judiciary Committee if the Democrats win in November, has already threatened a sweeping investigation of utilities and other industries if the Democrats win.

Until the Stietenroth defection, the Dixon-Yates contract proposal had been the center of a public-vs-private power conflict clearly marked. Adherents of the new Administration's power policy had no trouble aligning themselves in favor of this contract, and public power people opposed it, almost as a matter of course.

But Stietenroth's charges injected a new note. The feeling in Washington is that, while his statements may fall apart under close scrutiny, they could also give the general public a pre-election day impression against the utilities.

Much of Stietenroth's testimony was directed at documenting his charge that Middle South "dominated" the financial life of Mississippi P&L, in violation of at least the intent of the Public Utility Holding Company Act.

The Final Break

His final break with the company apparently was precipitated after a losing battle with Middle South at its New York office over a proposal to transfer a sizable portion of Mississippi P&L reserve funds to surplus. As Mississippi P&L treasurer, he testified, he felt that shifting the suggested $1,028,000 from the total $1,400,000 reserve would create a situation in which the Mississippi firm might risk bankruptcy because of its inability to meet future tax needs. Stietenroth said he argued for four or five hours, offering first to transfer $600,000, then $800,000, then, in complete frustration, offering the entire $1,400,000.

When Middle South insisted on the $1,028,000 transfer, he said, he asked that his name be withdrawn from the financial document he had previously "blank check" signed.

Stietenroth testified:

• While Middle South always "suggested" policies to be followed by Mississippi Power & Light and its sister subsidiaries—Louisiana Power & Light Co, Arkansas Power & Light Co, New Orleans Public Service Co—these were "wrapped around a lead pipe."

• Ebasco Services, Inc, another offshoot of the original holding company broken up under the holding company act, kept a second set of books in New York which were either duplicates of, or similar to, Mississippi Power & Light books in Jackson, Miss. When told Middle South representatives had denied keeping duplicate books at Ebasco headquarters, and that they were merely tax records on file in New York, Stietenroth commented that those representatives were "splitting hairs." He said records were so complete that he merely signed his name to already prepared tax returns, sent to him from New York, and that frequently the property schedule was not included until after his signature had been obtained.

• As principle common stockholder, Middle South voted itself a 9% annual maximum dividend. Stietenroth's point was the firm could not stand to be "milked" this way without a future raise in rates in the area.

• Middle South decided to call Mississippi P&L's 44,476 shares of $6 preferred stock, but did not reveal the decision to Stietenroth until after he had discovered the planned transaction by accident from several stockholders.

• Delta steam generating plant in Mississippi was built with two 105,000-kw generators, put into place because Middle South had already purchased them. He said only one was needed, since electricity being used in Mississippi P&L's territory amounted to 239,000-kw, while the new generators gave a capacity of 450,000-kw—far more than needed.

• Middle South had an arrangement between its subsidiaries permitting sale of excess power at $13.20 a kw year, although generation costs ran $16 kw year. This he called a hidden subsidy by Mississippi's rate payers to Middle South's power pool.

• If the Dixon-Yates proposal to build a West Memphis steam plant was a success—and he was sure it would be—finances would work out, but if the contract turned out to be a "white elephant," he said he was sure Middle South would "suggest" its subsidiaries absorb the losses, passing them on to ratepayers.

• Mississippi P&L fought the North Central Mississippi Power Association's attempt to become established in a marginal area of Mississippi Power & Light.

On this last point, Stietenroth wept as he related the details of an alleged Mississippi P&L official's attempt to "fix" the election to determine whether the North Central co-op should receive a franchise. He testified that when the co-op won the election, Mississippi P&L built what were called "spite lines," on which it charged special rates.

With the co-op now in the red, Stietenroth charged that REA had joined with Mississippi P&L in an effort to drive the young co-op out of business altogether. This charge was promptly answered by Deputy REA Administrator Fred H. Strong. He said North Central owes the government $1,250,000, and that its "unsatisfactory financial condition" has been a cause of concern in REA for two years. He said Mississippi P&L's offer to buy the association is only one of many proposals now pending before North Central's board of directors.

Middle South Not Heard

Stietenroth was the only witness put on the stand at midweek. Dan James, Middle South attorney, and Sen John Marshall Butler (R-Md.), a firm supporter of the Administration's power policy, attempted to interrupt the proceedings to answer statements of the ousted executive. But Chairman Langer gavelled both into silence, after heated exchanges in which Langer made it clear he would not permit anything to go into the record unless the statement came from a witness. And he did not indicate when and if he would call either James or Butler as witnesses. Butler is a member of the Judiciary Committee but not its anti-monopoly subcommittee.

As of last week, no word had yet come from the Joint Committee on Atomic Energy, which is scheduled to meet to consider AEC's request for a waiver to permit signing of the Dixon-Yates contract during Congressional adjournment. It is expected that Chairman Cole (R-N.Y.) of the Joint Committee will call a meeting swiftly once an agreement among all the principals involved has been reached.

MECHANICAL FAILURE resulted in extensive damage to 150,000-kw generator at Cromby

Generator Failure Studied

Cause of breakdown of 150,000-kw Cromby No. 1 unit of Philadelphia Electric Co still subject to verification

Investigation of the cause of the failure of the generator of the No. 1 unit of Cromby Station of Philadelphia Electric Co is still going on. The 150,000-kw machine failed at 12:03 am, Sept. 27 (EW, Oct. 4, p 55) while it was undergoing routine test. There were no personal injuries and no damage to equipment other than the unit.

The Philadelphia system has had no trouble in carrying load, and General Electric Co, manufacturer of the unit, expects to have the unit replaced no later than Dec. 15.

A spokesman for General Electric said,

"We have reached certain tentative conclusions which are subject to verification or modification when more complete evidence is on hand. It is obvious from the condition of the retaining rings that a retaining ring failure was not the cause of this difficulty. Further, factory records on tests on the generator rotor forging show that its physical properties and ultrasonic characteristics are satisfactory. The forging was a good one.

"As happens infrequently during the machining process, one slot of the forging was injured by cutter breakage. In accordance with long established practice, which heretofore has never given trouble, this injury was repaired by the insertion of several screwed-in studs, and the slot remachined. The evidence seems to indicate that failure started in the location of these screwed studs."

When the accident occurred, the turbine and trip mechanisms operated correctly and brought the unit to rest in the usual manner. There is indication of a heavy jolt toward the turbine, cracking the middle standard at the support arm of the intermediate turbine shell. Although it has not yet been possible to inspect thoroughly the turbine, damage is believed minor.

The generator was rated as follows: 220,588 kva, 0.85 pf, 0.64 short circuit ratio, 20,000 v, 3,600 rpm. For a more detailed description of this station, see May 3 issue, page 84.

State Body Asked to Kill Its Priest Rapids Bid

While the Washington State Power Commission authorized the state attorney general's office to represent the commission in a suit brought against it by the Grant County PUD, a Republican leader of eastern Washington called upon the commission to withdraw its application to build Priest Rapids Dam on the Columbia River.

Rep Walt Horan of Wenatchee, generally regarded as an advocate of public power, described Priest Rapids as the first project on the Columbia under President Eisenhower's "partnership" program and declared "it would be better if the state power commission gave the local operating utility, Grant County PUD, a clear field."

Opposition of the commission to PUD construction of the dam "could snag the whole partnership program, and if the idea is sunk we are retrogressing in our power program," said Horan.

Both the commission and the PUD have applied to the Federal Power Commission for a permit to construct the multi-million dollar project, developing 1.2 million kw.

The partnership policy was inaugurated because the nation can "no longer afford to raid the public treasury" for such projects as Grand Coulee Dam, Horan asserted.

At a meeting of the commission in Seattle, Chairman Walter S. Gordon declared his group favored having local agencies construct their own projects where possible but doubted that "such a small agency" as the Grant PUD should tackle a project the size of Priest Rapids. The commission has been trying to work out a plan under which the commission and PUD could cooperate in construction of the dam but has been unsuccessful, he said.

Pennsylvania P&L to Make Nuclear Power Study

Atomic Energy Commission has authorized Pennsylvania Power & Light Co, Allentown, to undertake a detailed study at company expense of economic and engineering feasibility of a large-scale, nuclear-fueled power plant for its system.

This is the fifteenth such study approved by AEC. It is to be completed within a year, and a report will be supplied by the firm to AEC. Pact permits company research to determine feasibility of installing atomic power generating station with initial capacity of 200,000 kw. Cleared Pennsylvania P&L personnel will have access to AEC installations.

Pennsylvania P&L made an unsuccessful offer to the government to take part in building a pressurized water reactor. Contract for this project was left to Duquesne Light Co of Pittsburgh. Construction on the Duquesne reactor began last month at Shippingport, Pa.

Ike Denies Curbing REA Plans

President disclaims NRECA's charge that his Administration is cutting rural power agency's program

National Rural Electric Cooperative Association and the Administration are feuding over the status of the rural electrification program.

When the President made his McNary Dam speech endorsing Interior Secretary Douglas McKay's "partnership" power policy, NRECA Pres Jack Smith said Eisenhower had dealt a "serious blow to the rural electrification program." He declared the President's remarks "foretell the end of an aggressive, dynamic rural electrification program in all areas of the United States where the systems depend upon low cost federal power."

Counter Move . . . Eisenhower countered with a letter of endorsement to Rural Electrification Administrator Ancher Nelsen. He stated that the Administration has no intention of cutting REA's program and that, in fact, it will back Nelsen's program to the hilt next year.

Eisenhower wrote Nelsen of his concern over "people busily circulating statements to the effect that this Administration is opposed to rural electrification programs and that these programs are to be drastically curtailed in the coming fiscal year." He termed such action "part of a general fear psychology now being adroitly generated in many fields by people who evidently have end to serve that they consider more important than the truth," and expressed the conviction that the rural population would not be "misled" by "such reckless and irresponsible statements."

Second Letter . . . Smith followed with another letter to Eisenhower, telling the President he has been misinformed about the status of the REA program. He said Interior Department and other federal officials have "acted again and again" against the rural electrification program, and indicated the President was talked into sending his letter to Nelsen so the letter could be used as a "misleading" document during the election campaign.

Smith's original blast following the McNary Dam speech sparked a bitter comment from Rep A. L. Miller (R-Neb.). Miller charged that the "hard core" of NRECA "seems to be made up of a small group of socialists" who have "warped every act to try to undermine members of Congress who happen to be on the Republican ticket."

In another defense of the Administration's rural electrification program, Secretary of Agriculture Ezra Taft Benson declared REA was lending more money to co-ops than in previous years. He said: "The Eisenhower Administration provided about $20 million more dollars to help with rural problems in REA than in previous year. . . . There is a big propaganda campaign being led by National Rural Electric Cooperative Association to discredit the Eisenhower Administration. . . . To hear them tell it all, the farmers in the country have no lights or telephones. . . . Here are some facts: At the end of the first fiscal year, June, 1954, REA loans totaled $241 million, more than twice the amount of two previous years. . . ."

Ellis Irks REA . . . REA officials are angry with Clyde T. Ellis, executive manager of NRECA, for what they consider personal attacks on the REA staff. Ellis has carried on running fight with Interior and other federal agencies, charging they have attempted to discredit the program.

In a recent article supplied co-ops, Ellis said: "The opposition in Congress to adequate loan authorizations, strangely enough, was based in part on inaccurate figures and tables prepared by government employees." REA staffers see this as a shift in Ellis' attacks from other agencies directly to REA Administrator Nelsen and his staff, and see a stiff battle coming.

Move to New Quarters

Southern Co and Southern Services, Inc, have moved their New York offices from 20 Pine St. to 250 Park Ave., New York 17. Their new telephone number is Plaza 1-2330. Affiliates of Southern Co are Alabama Power Co, Georgia Power Co, Gulf Power Co, and Mississippi Power Co.

Montville Plant Inspection Tied to Diamond Jubilee

Connecticut Light & Power Co played host last month to about 100 Connecticut city and town officials and manufacturers representatives when it exhibited an 82,000-kw turbogenerator recently installed at the utility's Montville steam power plant on the Thames River near London. The inspection was part of the utility's observance of Light's Diamond Jubilee.

Shown standing beside the new unit are (l to r) Sherman R. Knapp, president of Connecticut L&P, and Harry M. Chance, II, vice president of United Engineers & Constructors, Inc, the firm which installed the generator.

IN THE INDUSTRY

"Future of the Electric Fire—Where the Critics Are Wrong" was the title of an article reprinted in Electrical World (Dec. 8, 1952, p 41) from the British magazine, Electrical Review. This article was one of many that had been and still are to be noted in the electrical press of Britain. From them one gets the impression that comfort heating with electricity is indeed a warm subject of argument among our cousins overseas just as it is here. One can picture British power suppliers deeply involved in studying the data and characteristics of what must be comparatively a heavy load on their systems.

Electric House Heating in Britain Is Far Different

Therefore, when the writer of this piece embarked for Southhampton early this summer, he thought he might be able to obtain material for an article on house heating load on British supply lines. He failed because he found no record data on characteristics of the load such as Electrical World published so frequently from sources in this country.

This is understandable when one takes into account the great difference between weather conditions and heating requirements in the two countries. In the United States weather varies widely from one region to another. But even in any one region the range of temperature is usually a hundred degrees or more. In Britain, on the other hand, the range is very limited, about 50 degrees. This means that house heating in Britain is an all-year proposition not just a seasonal one.

More Space Heaters in Britain . . . This need for heat at almost anytime at almost no notice has contributed much to the popularity of the electric fire as the British call room space heaters. In proportion to population there are probably more space heaters used in Britain than in the United States.

Historically there is another reason for the popularity of the space heater abroad. For years homes in Britain have had no central heating systems. Instead each room has been heated by a coal-burning grate. During the war and the following years of austerity, the use of coal was restricted. Naturally the people turned to the most convenient alternative, the electric fire. They did this despite official exhortation and pleading not to do so because electricity was also in short supply. And manufacturers, rejoicing in the lusty market, did the best they could to meet the demand. As is customary there was no choice for the power suppliers but to provide the energy demanded by their customers. However, until a few years ago there were fixed "blackout" periods during the day in cities where the suppliers lacked the capacity to supply the demand.

British House Heating Data Scarce . . . The result of this has been the tremendous growth of house heating in Great Britain. But how much it amounts to in connected load or electricity consumed, the visiting editor was unable to discover. Nor in this country do we have such data on the portable heater load although there are said to be over ten million of them in homes for a saturation of over 20%.

To the casual observer abroad, there is apparently a much greater use of electricity for heating commercial and industrial establishments and public buildings such as churches and schools than in this country. In this field we have something to learn from the Scots. For instance, some heating installations are on off-peak rates, thermal mass maintaining comfortable temperature through peak periods. In Glasgow the writer saw a school with outside walls only two thirds of the way to the roof, and the children quite comfortable because of electric heating.

Such progressive steps will be hailed by the industry in America. At least they will if Americans are as willing to be pupils as they are to be teachers and exponents of electrical living.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Multi-conductor (No. 20) control cables save about one-third in comparison with the customary No. 9 circuits.

Kilovars as well as power should be applied as close to the load as possible for minimum system line losses and best voltage.

Methyl methacrylate coating on painted walls appears to be effective in preventing ink and pencil marks on the surfaces without significantly altering the color of the paint.

Heat dissipated in Btu per hr by electric lights, radios, TV sets, and appliances is 3.4 times the aggregate of input watts.

Logarithm of insulation life is a linear function of the absolute aging temperature (T. W. Dakin).

Carrier signal attenuation will be higher than average during periods of deposit of flyash or similar materials on insulators. Heavy rain will decrease attenuation if it washes off the deposits.

Lower level of center phase conductors of untransposed high-voltage lines tends to make substantial reduction in the inherent unbalance. Higher relative level for medium-voltage lines will reduce their unbalance. Raising all phases alike causes increase in unbalance.

Fundamental frequency of uniform windings with isolated neutral can vary only 10.3% from the value for a transmission line and that for an ideal transformer both expressed in terms of the total inductance and the capacitance to ground.

Automatic computers point to the possibility of automatic dispatching for maximum efficiency and machine forecasting of loadings.

Turbine outage hours in 1951 were attributed (in percentages of the total) to the following factors: annual inspection, 66.26; bucket or blades, 6.13; control gear, 4.98; bearings, 4.65; steam casings, 3.70; shaft, 1.76; vibration, 1.48; and other factors, 11.04.

it's time for a new meter...

when Mrs. Forbes...

gets her automatic laundry

Better look at the Forbes' meter—it's probably inadequate. It was never designed to measure a load like this. It may run slow on heavy loads, or it may burn out.

The Sangamo J2, the meter with straight-line accuracy up to 100 amperes, will prevent lost revenue. The J2 has adequate capacity to carry 100 amperes continuously without overheating and sufficient torque to accurately measure even the lightest load.

The J2 is *the* slow-speed meter that makes fewer revolutions per kilowatt-hour—bearings last longer.

When you buy new meters to handle today's growing use of electricity, protect your investment by choosing a meter with plenty of reserve capacity for continuously growing loads.

Choose the new Sangamo J2—the first . . . and finest . . . 15 ampere meter with 100 ampere capacity.

A METER WITH STRAIGHT LINE ACCURACY

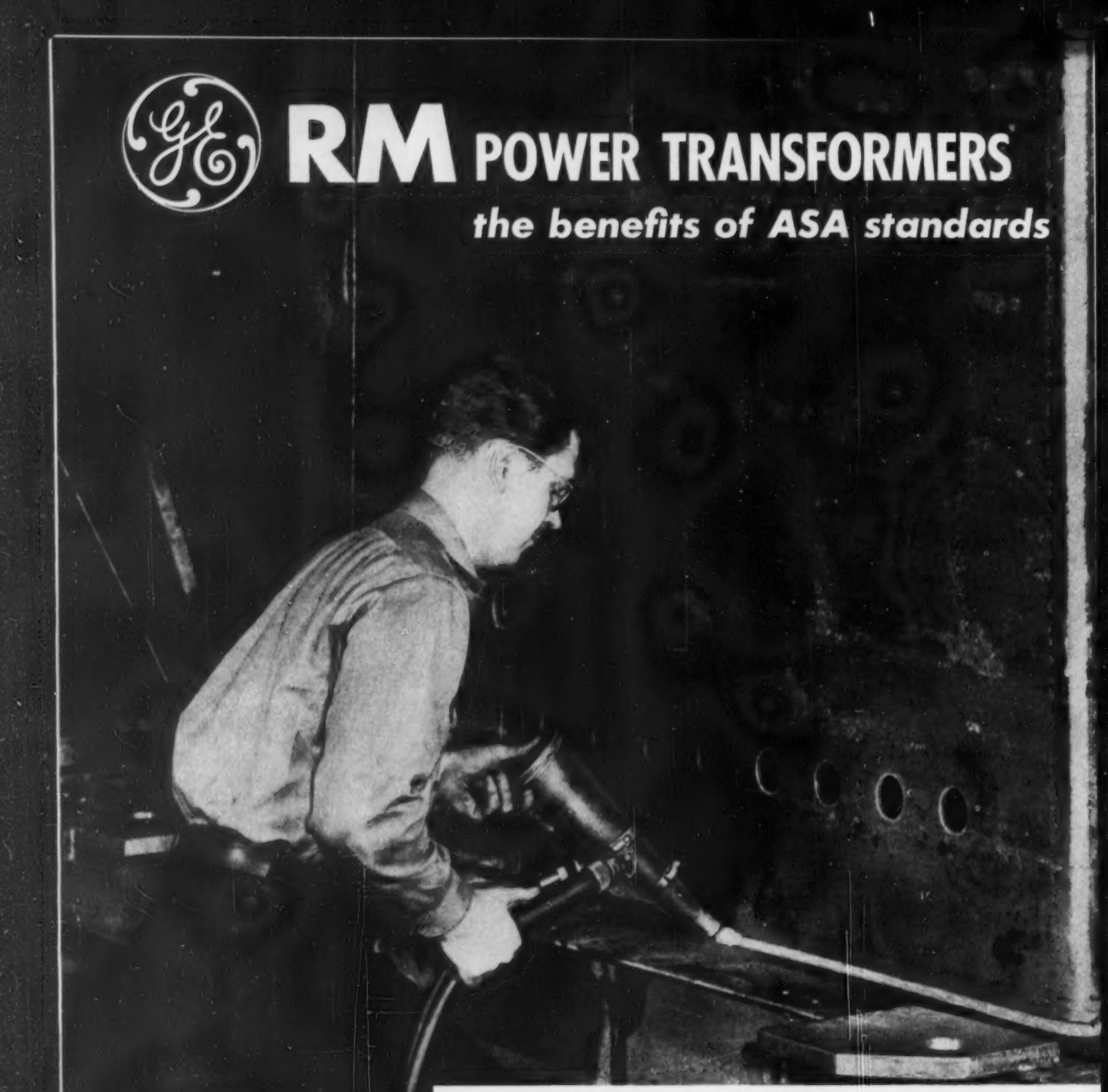
UP TO 100 AMPERES

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

JM24-6

RM POWER TRANSFORMERS

the benefits of ASA standards



RM* brings you all these benefits

Repetitive Manufacture gives you the economy of a standardized product, yet with optional ratings and accessories sufficient to meet most special needs. Ordering is simpler, shipment is many weeks faster, and prices are up to 8% lower than those of nonstandard units.

**RM is the G-E designation for ASA-standardized power transformers 69 kv and below, 501 through 5000 kva single-phase, and 10,000 kva three-phase.*

LOWER PRICE

plus . . . . . Stronger liquid-tight tanks

because submerged arc welding strengthens major tank joints

When you need a transformer in the medium range, order a Repetitive Manufacture transformer, and you'll get all the benefits of ASA standards plus many extra advantages that give you better performance, easier handling and less maintenance.

STRONG, LIQUID-TIGHT TANKS, for example, virtually end damage and leaks from shipment and handling. Tanks are stronger because submerged-arc welding, pictured at left, strengthens all major tank joints. In this new process now in use at General Electric's new Medium Transformer Plant, an electrode wire is fed into an arc which is submerged in the granulated flux material deposited ahead of the arc by the welding head. Uniform welding speed is maintained by a driver geared to this head.

Developed by General Electric, this continuous welding process assures stronger, less brittle, more dependable welds of deeper penetration at major tank joints. Damage which can result from shipping and rough handling is minimized and tanks remain liquid tight.

MANY OTHER BENEFITS result from the advanced methods and processes used in General Electric's new plant at Rome, Ga. These include high dielectric strength because vapor-phase drying removes entrapped moisture; superior rust prevention because new Super Melaglyp paint finish lasts up to 150% longer; quicker delivery from faster, conveyorized production. Built solely to produce power transformers in the medium transformer range, this plant serves electric utilities and industry by turning out better products in a shorter time. You can get full information about RM power transformers by contacting your nearest G-E Apparatus Sales Office, or writing for Bulletin GEA-6108 to General Electric Company, Section 422-10, Schenectady 5, New York.

Progress Is Our Most Important Product

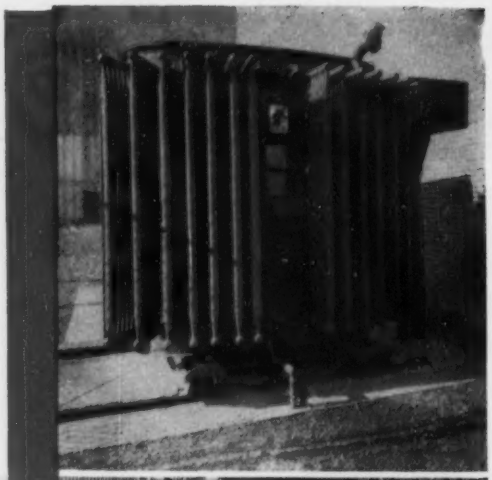
GENERAL ELECTRIC

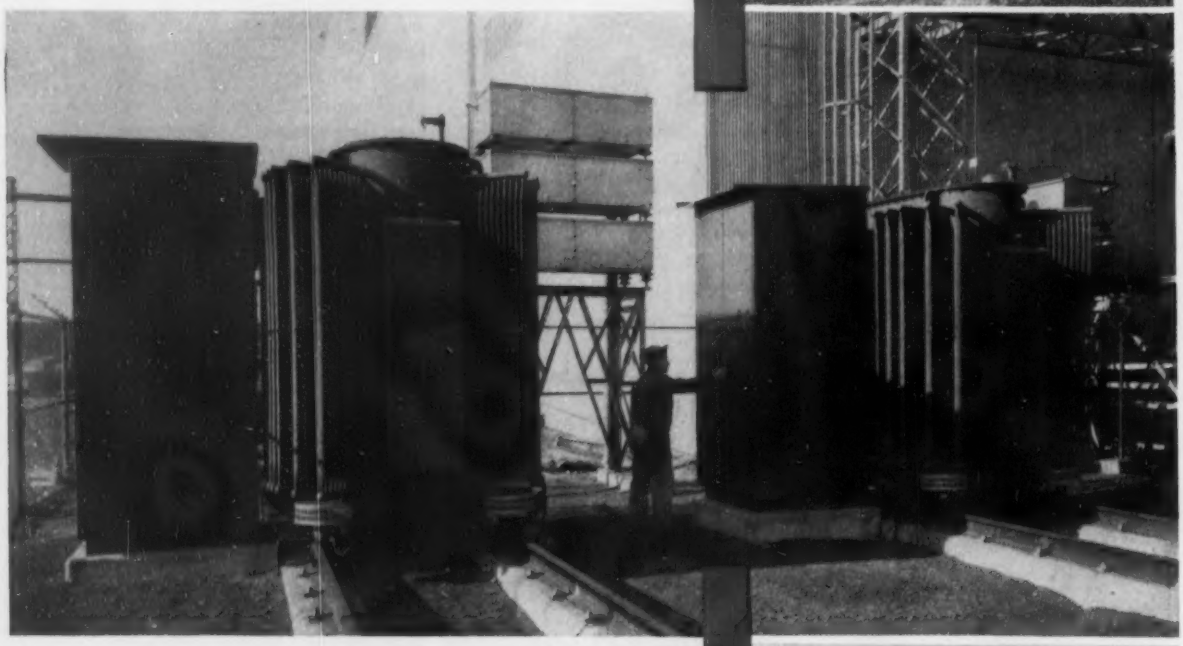
SIMPLIFIED PURCHASING

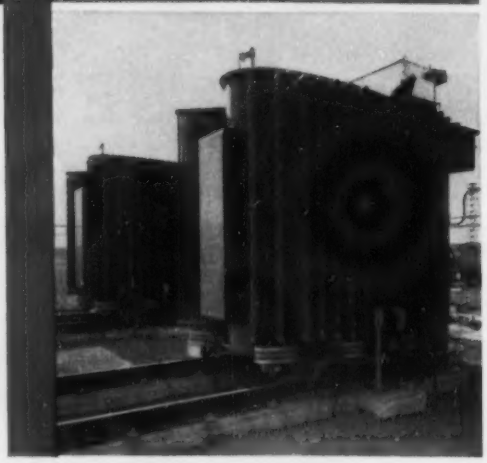
SHORTER SHIPMENT

G.E.'s NEW ROME, GA., TRANSFORMER PLANT—built specifically to meet the growing trend to standardize power transformers.

23 PENNSYLVANIA UNIT SUBSTATION TRANSFORMERS feed all 2400 volt lines at United States Steel's Fairless Works







19 — 2500 Kva and 4 — 3750 Kva Pennsylvania Transformers are supplying power at 2400 volts to operate open hearth furnaces, blast furnaces, hot and cold rolling mills, and coke ovens at the famous Fairless Works. Functioning as important components of I-T-E Unit Substations, these Pennsylvania Transformers assure an uninterrupted flow of power from the 13,800-volt power system to the 2400-volt distribution system.

Pennsylvania Transformer Company manufactures a complete line of power and distribution transformers, 3 Kva through 300,000 Kva, in voltages up to 330,000 volts.

PENNSYLVANIA TRANSFORMER COMPANY

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LOW-FLY PHOTOGRAPHY PRODUCES HI-FI SURVEY

CHARLES F. PEARSON, general supervisor, Survey Section,
Cleveland Electric Illuminating Co

A slow-moving, low-flying plane equipped with a large camera is now getting survey information for Cleveland Electric Illuminating Co in about one third the time it used to take to do the job on the ground.

The plane photographs highways and streets on which new transmission wood pole lines, street light installations and distribution line reinforcements are planned.

The photographs, enlarged to a scale of 50 ft to the inch, are used as a basis for foundation drawings which show roadway widths, driveways, trees, buildings that may affect construction, pole locations, property lines, and ownership, and instructions for line material changes required.

Story continues on next page

Using an air shot such as the one below on opposite page, survey men prepare

AERIAL 'RECON' HELPS CEI TO SURVEY ITS DISTRIBUTION SYSTEM

Survey work once cost Cleveland Electric Illuminating Co 17 man-days per mile on wood pole transmission lines (average year's work: 40 miles), and 5½ man-days per mile on street light layouts and distribution line reinforcement (average year's work: 150 and 140 miles, respectively).

Actual saving in man-days by the aerial photography method now in use is 65%, which more than compensates for cost of the photography.

The company's survey personnel had no previous experience with aerial map interpretation, except for a few men who had done similar work in the Army. Four of these men were sent to a course in Elementary Photogrammetrics at Case Institute of Technology. But to a large extent the department has developed its own techniques, and has made much of its own equipment, to serve the company's somewhat specialized purposes.

The new method met with some opposition at first; doubts were expressed as to its accuracy. However, as the survey people swiftly developed the skill required to interpret the photographs, the advantages of the method became obvious in day-to-day practice. In any event, all work is field-checked before release, as a final safeguard. There was also, in some quarters, the inevitable opposition to change, but this soon evaporated.

They Fly in Winter . . . Most aerial photography is done in the winter, to avoid the screening effect of tree foliage. By Nov. 15 the photography schedule for the coming winter will have been determined, with the help of county maps showing areas already flown. Most of the actual flying will be done between Dec. 1 and March 15, on sunny days. Experiments are going forward with summer flying, but this is restricted to early morning and late afternoon periods, to obtain longer shadows. The photograph interpreters depend on shadows for the bulk of their data.

Usually, the plane flies directly over the center line of the street. The camera lens has a focal length of either 8¼ inches or 12 inches, and the plane's altitude, determined by this focal length, is such as to give a contact print to a scale of 160 ft to the inch. It is these prints, about 9 inches square, in single weight glossy finish, which are delivered to the survey group, along with data on camera focal length and flight altitude. Each print overlaps the next along the line of flight by about 60%.

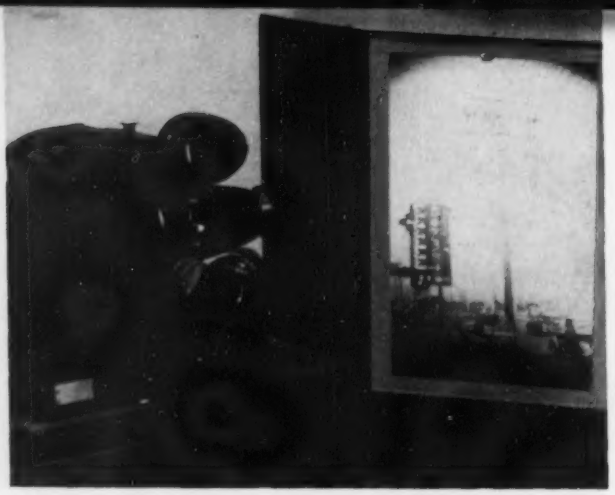
The prints are first examined with a stereoscope and all pertinent information is marked on them with a grease pencil. They are then checked for scale. The scale is determined by comparing a measured distance between two points on the photograph at approximately the same elevation with a known distance on the ground. This known distance may be obtained from one of several sources—county records, plat books, allotment maps, or controlled points established by the Cleveland Regional Geodetic Survey in Cuyahoga County.

To avoid distortion at the edges, only the center parts of the prints are used. They are fitted together along the center line of flight to form a mosaic, which is mounted on heavy cardboard and marked with the picture scale, as well as the enlargement factor required to bring the scale to 50 ft to the inch. The terrain in the area is sufficiently flat to make distortion due to relief a negligible factor.

Enlarged blow-ups are produced on an ingenious arrangement which includes an opaque projector, a table with a transparent plexiglass top, and a front surface mirror at a 45° angle to reflect the projected image upward to the table top. The projector itself is a moderately priced commercial product. It is mounted on floor tracks which give it a range of enlargement from 2:1 to 4:1, and its movement along the tracks and focussing adjustment are worked by small reversible reduction motors controlled from switches close to the light box. All

a mosaic that can be read more accurately than a map

Photographer uses camera and sight rod . . .



. . . to get film from which notes are transcribed

of this equipment, except the projector, was designed and built by company personnel, and the complete unit cost about $400.

Aerial Projection . . . The unit works best in complete darkness, although it can be operated in a partially darkened room. The aerial photograph is projected on tracing paper laid across the plexiglass table top, on which the center line of the road has been marked and scale control points established. The projector is then adjusted until predetermined points on the projected image coincide exactly with the points on the tracing paper, thus assuring the correct scale of 50 ft to the inch.

Before the illuminating company went into aerial photographic survey work, it had done considerable experimenting with ground photography. Photographs of poles taken from street level are still used extensively to supplement the information gained from the aerial photos. Cameras used in ground photography are of the 35-mm type, using direct positive film to bring in field conditions as closely as possible. The camera is mounted at one end of a 36-inch rod, on the other end of which is a small blackboard bearing such pertinent information as the number of the pole being photographed and the direction in which the camera is pointing. The blackboard appears in the photograph, and an ingenious system of pointers attached to it makes it a simple matter to calculate the height of the pole.

One man can carry out the ground operation, photographing 80 to 100 poles in an average day. The 35-mm ground pictures are placed in an SVE projector with 3-inch focal-length lens, from which they pass through a reflex projector to a translucent screen. Result is picture about 8 x 10 inches.

The company's interest in photographic survey work dates from 1949, when a study of survey costs indicated a need for cutting expenses. With the expansion of the company's service area, transportation time had become an important cost factor. Attention was therefore directed to photography as a means of eliminating repeated field trips.

As an experiment, one of three high-line survey crews was equipped with a 35-mm camera for taking ground photographs of poles, to supplant written notes. Comparison with the work of the other two crews showed a time saving of about 50%, and this saving was reflected on note transcription in drawing. Accordingly, the company adopted ground camera operation on a permanent basis, purchasing two 35-mm cameras. For the first two years, a careful record was kept which confirmed the original estimate of a 50% saving in time.

Into the Third Dimension . . . This type of photography has up to now been confined to the winter months, when the trees are free of leaves. Some experimenting is now being done with cameras which give a three-dimensional picture, and results have been encouraging.

After ground photography had proved its usefulness, the company began to consider the possibilities of aerial photography. In common with other utilities, the Illuminating company had for some time used aerial maps for the planning of tower lines and preparation of system maps; but the purpose now was to extend the application of aerial photography to the preparation of distribution layouts. These distribution layouts, while requiring some degree of accuracy, do not demand the extreme controls required in accepted standards of photogrammetric survey work.

The first experiments were with photographs taken from 5,000 ft or more, in summer. These were unsuccessful, as tree foliage blocked out more than 60% of the detail required.

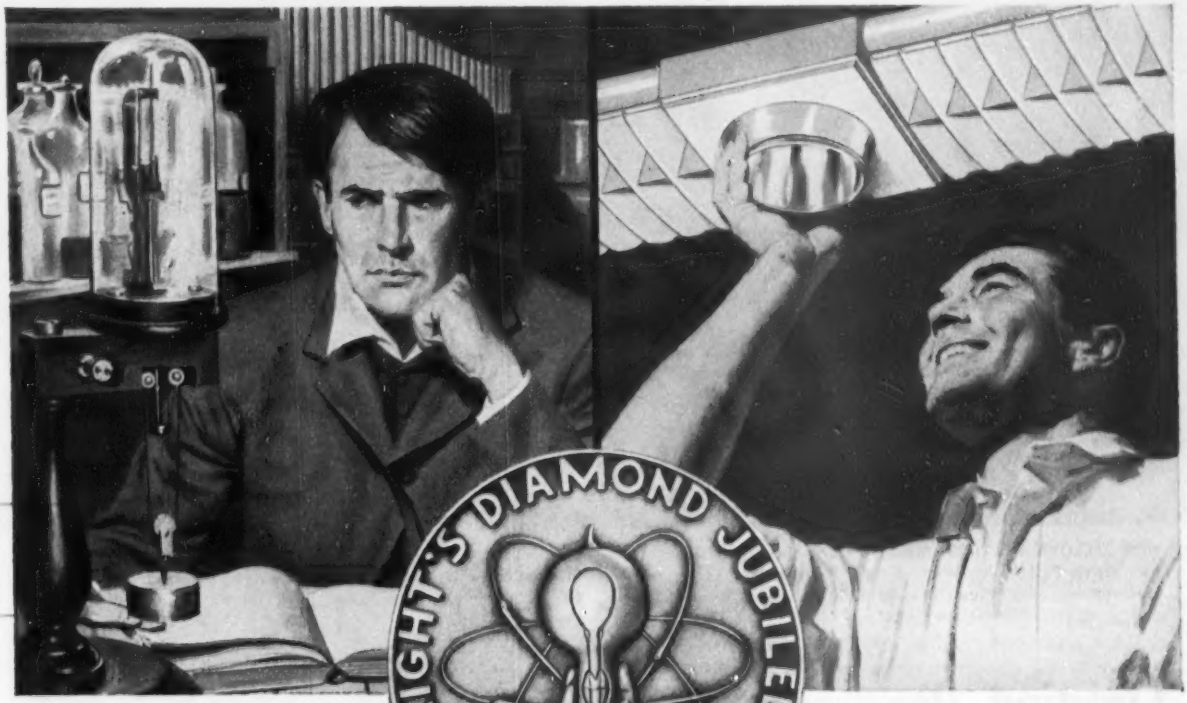
Then attempts were made to use maps taken from lower altitudes, in winter, by Aero Service Corp working for the Cleveland Regional Geodetic Survey. They proved useful for route studies, but were short on detail, and, being about two years old, were in some respects obsolete.

Late in 1953, the company obtained some photographs taken by Aerial Surveys, Inc, of Cleveland from an altitude of 1,200 ft, and they appeared to meet all requirements. Accordingly, the present system was set up, and it has proved entirely satisfactory for the great majority of survey purposes.

Next: Strip Camera . . . Further inquiries are being made into two promising possibilities: summer flying in selected areas, and the use of strip aerial cameras which give greater ground detail. Summer flying has been tried, with fair results. Research with strip aerial cameras has been temporarily discontinued because of present high cost of camera equipment and pilot training. Research aimed at improving photographic quality and instrument precision will continue indefinitely.

Aerial photography has thoroughly established itself as a permanent feature of the Illuminating company's operations. The feeling is that its future possibilities are promising.

During this Diamond Jubilee of Light...



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Sylvania seeks still greater LIGHTING PROGRESS

Since 1901, Sylvania has pioneered in the development and improvement of incandescent lighting. Year by year, improvements in materials, methods, and testing techniques have brought about the Sylvania bulbs, well known today as "The Best Light in Sight."

In 1939, Sylvania introduced its first fluorescent lamp. And again, continuous laboratory research and improved methods have paid off in far superior products . . . lamps which give more lumens of light per dollar throughout their life.

And today, at the 75th anniversary of electric light, Sylvania lighting engineers are working toward still greater achievements . . . endeavoring to bring still more efficient and more economical light to homes, schools, commercial and industrial organizations throughout the world.

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LIGHTING • RADIO • ELECTRONICS • TELEVISION

NEW FELLOWS GETTING EMBLEMS are C. E. Egeler, General Electric; Myrtle Fashbender, Westinghouse; President Manwaring making presentations; Kurt Franck, Holophane; K. S. Gibson, National Bureau of Standards; J. J. Neidhart, Westinghouse; C. H. Rex, GE. New fellows not in picture are D. M. Finch, Univ of California; R. L. Oetting, GE; R. A. Palmer, Duke Power; F. D. Wyatt, Chicago Park District

Lighting Progress Viewed by IES

New lighting products, sources, and techniques demonstrated at technical conference

The showing and demonstration of many new lighting products, sources, and techniques highlighted the National Technical Conference of the Illuminating Engineering Society held in Atlantic City, Sept. 13-17.

Addressing the conference, attended by more than 800 persons, B. L. England, president, Atlantic City Electric Co, said that the great advancement in the levels of lighting brought about by illuminating engineers has played a major role in improving the economic, social, and industrial life of America.

IES President, A. Homer Manwaring, vice president of Philadelphia Electrical & Mfg Co, emphasized the importance of regional meetings of the society and the benefits offered by the society. He included the continuous flow of lighting knowledge and information developed by the technical and application committees.

President-elect Duncan M. Jones, Curtis Lighting Co of Canada, Ltd, said that illuminating engineers may be lacking in basic data. He urged that steps be taken to expand research efforts to probe and discover new and unexplored concepts and recommended an energetic campaign for greater sustenance to make this expansion possible.

Lighting Progress Report . . . A principal event of the conference was a dramatic report of lighting progress presented by the chairman of the Society's Progress Committee, Eugene Beggs, Westinghouse. All of the important advances during 1953-54 in light sources and equipment and their applications were described and demonstrated.

Among the new light sources shown were the 400-w deluxe fluorescent mercury lamp with improved color correction, 100-w rapid-start fluorescent lamp, improved sealed-beam auto headlamp, and 100 and 175-w mercury lamps for street lighting.

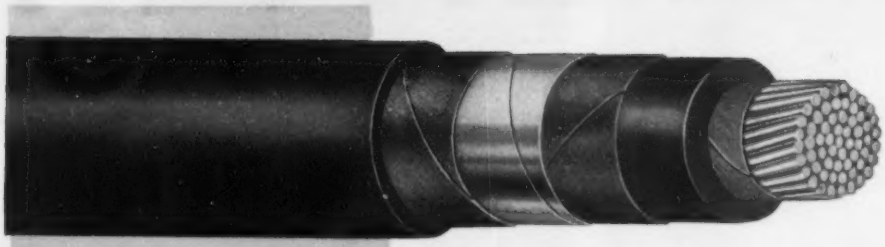
A panoramic picture of light through the ages to the discovery of the incandescent lamp was presented in tableaus showing the clay oil lamp, candle, kerosene oil lamp, Welsbach mantel, Edison at Menlo Park and the Goddess of Light.

An historical lamp exhibit displayed by James H. Rich, Philadelphia Electric Co, included 150 lamps from 600 BC to 1879.

Lighting Job Contest . . . One of the outstanding features of the conference was a contest in which the most original and interesting lighting jobs in the country were presented.

The installations were described by winners in the IES Regional Conferences of "My Most Interesting Lighting Job Contest."

First prize went to Floyd Sell and Duncan Preston, Detroit Edison Co, for "Special Application at the Detroit Plating Co." J. J. Tynan, Atlantic City Electric Co, was awarded second prize for "Floodlighting Office Building,"

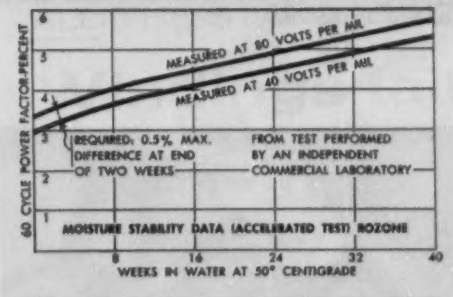


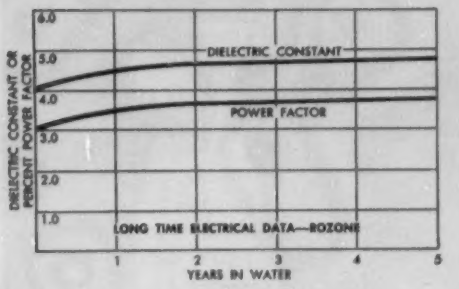
500,000 CM, single conductor shielded, RoZone-RoPrene power cable, rated at 9 KV.

Rome RoZone®

Superior Ozone-Resistant Insulation Deserves Your CONFIDENCE

As indication of their behavior in service and conformity to specification, insulated cable specimens are measured electrically for moisture absorption after long-time immersion in temperature controlled water baths.


60 CYCLE POWER FACTOR-PERCENT
MEASURED AT 80 VOLTS PER MIL
MEASURED AT 40 VOLTS PER MIL
REQUIRED: 0.5% MAX. DIFFERENCE AT END OF TWO WEEKS
FROM TEST PERFORMED BY AN INDEPENDENT COMMERCIAL LABORATORY
MOISTURE STABILITY DATA (ACCELERATED TEST) ROZONE
WEEKS IN WATER AT 50° CENTIGRADE



What Its Exceptional Moisture Resistance Means To You

Q: What effects can moisture have on cable insulation?

A: The presence of moisture absorbed in cable insulation alters its electrical character and, depending on the type of insulation, may effect those characteristics most important for service . . . causing failure.

Q: Can the effects of moisture be predetermined?

A: Yes . . . by long-time electrical measurements or by recently developed electrical stability tests. Since it is not only a question of "how much" moisture is present but, even more important, its location or distribution within the insulation, an electrical test is considered to be the only truthful yardstick of performance.

Q: Does RoZone resist moisture satisfactorily?

A: Yes. Experience and long-time test data have proved RoZone has exceptional *electrical stability in the* presence of water and its performance is not impaired by exposure to water.

Q: Where could cable insulation become appreciably exposed to water during service?

A: In submarine service, buried directly in the earth, or in wet ducts or conduit. Water is present almost everywhere and may condense in raceways or on cables suspended in air. RoZone is recommended for any of these applications.

• **NEW 45-minute sound color film "CABLE—PATHWAY OF POWER" now available for showings to technical personnel.** For bookings, write to Rome Cable Corporation, Rome, N. Y.

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RoZone is approved and accepted by leading utilities, industrials and consulting engineers.

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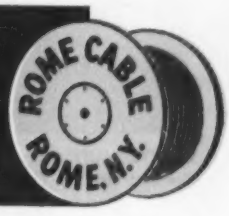


PRESIDENT-ELECT Duncan M. Jones, right, is congratulated by Pres A. H. Manwaring. Marshall N. Waterman, vice pres-elect looks on

HIGHEST HONOR in lighting field, 1954 IES Gold Medal, is presented to Erwin F. Lowry, Sylvania Electric Products, by Pres Manwaring

and the third award went to Louis N. Goodman, Louis N. Goodman Associates, New Orleans, for "Lighting the Lobby and Waiting Concourse of New Orleans Union Passenger Terminal."

Other contestants were Leon T. Johnson, Public Service Electric & Gas Co, Newark, N. J.—"Lighting Billing Department of Public Service Co"; Eric Ackland, Eric Ackland & Associates Ltd, Vancouver, B. C.—"Lighting St. Anslem's Church"; P. A. Ducasse, Quebec City, Quebec—"Lighting a Furniture Store—Luv-tile Ceiling"; E. H. Schaefer, Wisconsin Electric Power Co, Milwaukee—"A Light That Is Kind to a Star Sapphire"; Starr V. Monsees, City of San Diego, Calif.—"Lighting the California Tower."

Regional award winners not present were Lyle M. Bailey, Albert Sechrist Mfg Co, Denver, Colo.—"Lighting Denver National Bank"; and Floyd Covington, Post Engineers, Ft. Sam Houston, Texas—"Lighting a Drafting Office."

New Officers . . . New officers announced were: President, Duncan M. Jones, Curtis Lighting of Canada, Ltd, Montreal; Vice-Presidents, R. F. Hartenstein, Ohio Edison Co, Akron, and Marshall N. Waterman, Westinghouse Lamp Division, Bloomfield, N. J.; General Secretary, Kirk M. Reid, General Electric Co, Cleveland; Treasurer, George J. Taylor, Day Brite Lighting, Inc, New York City.

New Directors are L. C. Twichell, Rochester (N. Y.) Gas & Electric Corp, and John S. Walsh, Pacific Gas & Electric Co, San Francisco.

LIGHTED SUIT AND PADDLES to aid night landings of aircraft on carriers are demonstrated by Theodore H. Projector of the National Bureau of Standards

PORTABLE GARDEN LIGHTING UNIT shown by Miss Mary Taepke, Home Service Department, Detroit Edison Co

WESTINGHOUSE TYPE SL DISTRIBUTION TRANSFORMERS

ALL THE STANDARDIZATION SAVINGS PLUS

Windings tailored to electrical characteristics

Westinghouse Standardized Type SL Distribution Transformers save delivery time (they're in stock now), save in initial, installation, operating and maintenance costs with a design proved sound by years of customer acceptance.

And in addition—three basic winding designs are used to give you a transformer tailored for each standard voltage and current requirement.

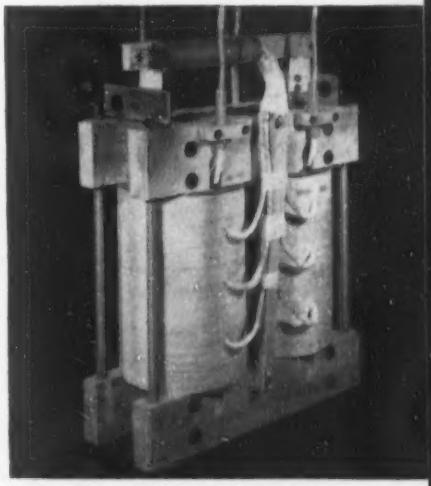
The most widely used of these windings is the Lowgrocap* (low ground capacitance) cylindrical coil design for low-voltage, station-type transformers. Besides being lighter and smaller, Lowgrocap is exceptionally capable of evenly distributing electrical stress caused by lightning or switching surges.

For higher voltages, the continuous pancake winding or the round wire pancake winding is used.

Hipersil® cores, all-welded steel tanks, the Type WSB no-load tap changer and many other standard design features make Westinghouse SL Transformers your logical choice for any substation application.

Call in your Westinghouse Representative today for details. Or, if you prefer, write direct for B-6134 to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa. J-70717

*Trade-mark



Lowgrocap winding for low-voltage, station-type transformers.

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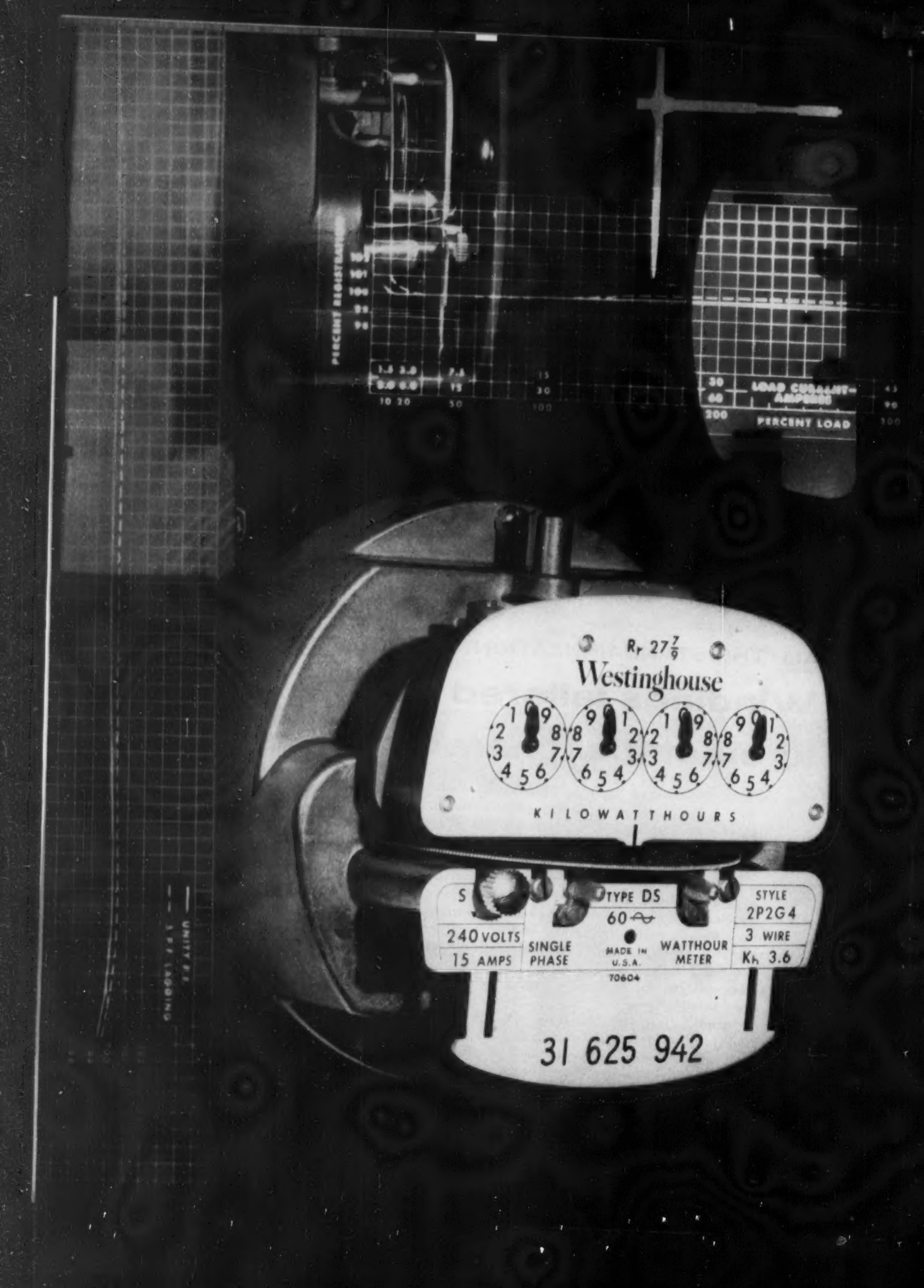
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LOAD CURRENT-AMPERES
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Helping the industry meet its growing loads

New Lifetime Meter will handle all single-phase loads

Electric utilities are now faced with the necessity of replacing many old meter installations because they do not have the range and thermal capacity required for modern loads.

For the replacement of such meters and to provide for any single-phase metering requirements in the foreseeable future, Westinghouse has introduced the Lifetime Meter—a meter with a truly amazing range. It will measure accurately all loads from less than 0.1 ampere to 200 amperes.

Lifetime Meters are offered in two ratings—Type A (bottom-connected construction) and Type S (socket construction) to handle loads up to 100 amperes, and in the S-mounting to handle up to 200 amperes.

The American watthour meter industry has for many years produced a high-quality product from the standpoint of economy, accuracy and long life. Westinghouse has contributed much to this high state of development. Over 66 years* of experience in the design and manufacture of watthour meters have been incorporated by Westinghouse engineers into this new Lifetime Meter . . . and the extended development work required has paid off by making it a better product.

The final result is a more simplified and highly perfected meter—made possible by the most modern engineering and materials. So far advanced is the Lifetime Meter that it can be guaranteed for thirty years.

This guarantee emphasizes the validity of every claim made for this new meter . . . truly a Lifetime Meter. J-97184

*Shallenberger Meter—1888

Lightning surge protection

Here's how the problem of lightning surge damage has been handled in the Lifetime Meter. Both the current and the potential coils in the meter have a 10,000-volt insulation level. The socket-type meter has a De-ion® arrester gap located in the back of the base and arranged to discharge outside of the meter. In the bottom-connected (A-base) meter, a relief gap is provided between the series winding and the base. The gaps discharge at 4500 volts, well under the 10,000-volt insulation level of the coils, draining off surges safely.

Corrosion protection

The Lifetime Meter represents a sound approach to the truly corrosion-proof design, a vital factor in long life. The register gears and shafts have a gold finish. The socket-meter base is Moldarta*, a special, Westinghouse-developed plastic. The laminations in the electromagnet are Bonderized, the most effective finish yet found for locking out corrosion at this vital point.

The cover rim and sealing ring are iridited aluminum. All materials and finishes are selected and co-ordinated to give maximum protection against corrosion.

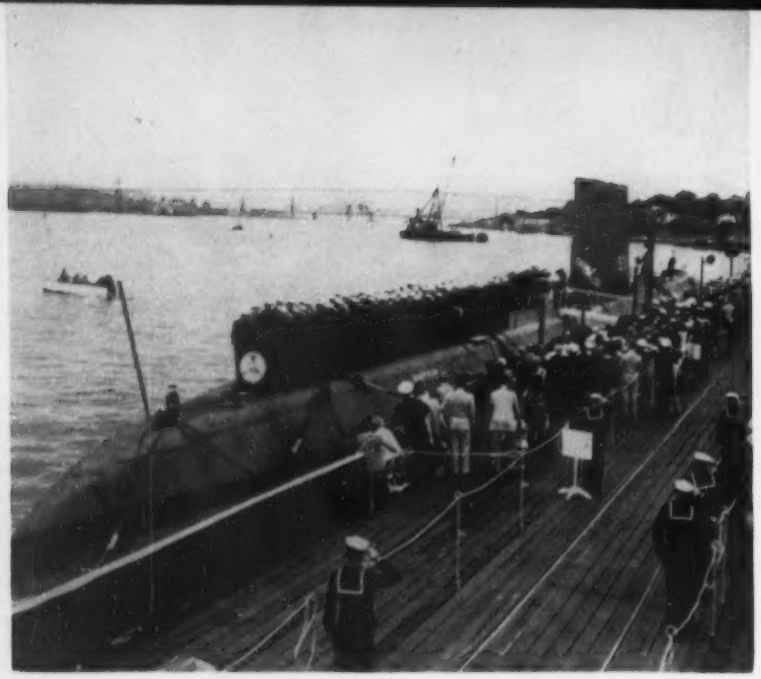
*T. M.

Stability

In order to provide long-life accuracy, a meter must have mechanical, electrical and magnetic stability. Here is how these qualities have been achieved in the Lifetime Meter. Every part of the meter is built and controlled within tolerances that eliminate the need for any adjustments in order to make parts fit. There is no chance of any variation to cause accuracy changes in service.

The Lifetime Meter features the ball and jewel bearing, pioneered by Westinghouse in 1902; the only time-proved lifetime bearing. Action is unimpaired, even under extreme overloads.

YOU CAN BE SURE... IF IT'S **Westinghouse**



Atomic Submarine Joins the Fleet

The nation's first atomic submarine, the USS Nautilus, was placed in the service of the U. S. Navy late last month at a commissioning ceremony at Groton, Conn. The high-powered sub can travel 20 knots while submerged. Its atomic power plant, embodying a pressurized water reactor, was built by Westinghouse Electric Corp. The first large-scale nuclear power plant being constructed by Duquesne Light Co and Westinghouse at Shippingport, Pa., under sponsorship of Atomic Energy Commission, will contain this same type of reactor.

Armour Plans Reactor for Industrial Research

First industry-financed nuclear reactor for research purposes will be established at Armour Research Foundation of Illinois Institute of Technology.

The reactor is designed for 50,000 w.

Plans for the reactor are being submitted to Atomic Energy Commission and Dr Richard F. Humphreys, director of the project, estimates that the reactor will be in operation in approximately 12 months, in routine operation in 18 months.

In making the announcement Dr Humphreys emphasized that the reactor will not be for power production purposes. It will be for research purposes. However, the power industry, among others, has been approached to determine its interest in sharing installation and operating costs and having access to the reactor for research problems.

The reactor will cost an estimated $500,000. Armour Research Foundation plans to put up approximately one third of the cost. It will invite industry in the Chicago area to participate in financing the remaining two thirds of the cost, with subscriptions of $20,000 for each firm. A program has been worked out whereby a company sharing in the cost may expect to get back its money in tangible benefits in three years. It was emphasized the foundation is not asking for donations.

Nuclear Committee Set Up by Engineering Groups

General Committee on Nuclear Engineering and Science has been created under the sponsorship of Engineers Joint Council.

The new organization has been established to "meet the pressing problems of nuclear engineering and related sciences," emphasizing industrial uses of atomic power.

Joining the council in the new nuclear engineering committee is the American Chemical Society. The Joint Council encompasses 170,000 members, while the chemical society has a membership of 70,000.

Other groups concerned with nuclear development also have been invited to participate in the activities of the new committee.

The General Committee on Nuclear Engineering and Science plans a Nuclear Congress to be held July 11-16, 1955 with an expected attendance of 1,500. Should the United Nations hold an international scientific conference on atomic energy in North America next year, however, the newly formed committee will forego its own congress and help in the planning of the UN conference.

Dr John R. Dunning, dean of engineering at Columbia University, has been elected chairman of General Committee. Secretary and general chairman is Dr Donald L. Katz, University of Michigan.

POWER BRIEFS

● Duquesne Light Co completed its $62-million Elrama power plant near Clairton, Pa., when it placed in operation this month the third generating unit. The 120,000-kw unit, largest ever placed in service on the utility's system, boosts Duquesne Light's capacity to about 1,057,000 kw.

● Los Angeles' Mayor Norris Poulson has proclaimed Oct. 17-24 as Electric Week to mark the 75th anniversary of Thomas Edison's invention of the incandescent lamp.

● Washington Water Power Co hopes to start building the $85-million Noxon Rapids Dam by the middle of 1955 and to produce power by late 1959. Utility reports test drillings and preliminary engineering are progressing rapidly at site on Clark Fork River in Northwestern Montana. WWP expects to file application with Federal Power Commission next year for a license for 350,000-kw project.

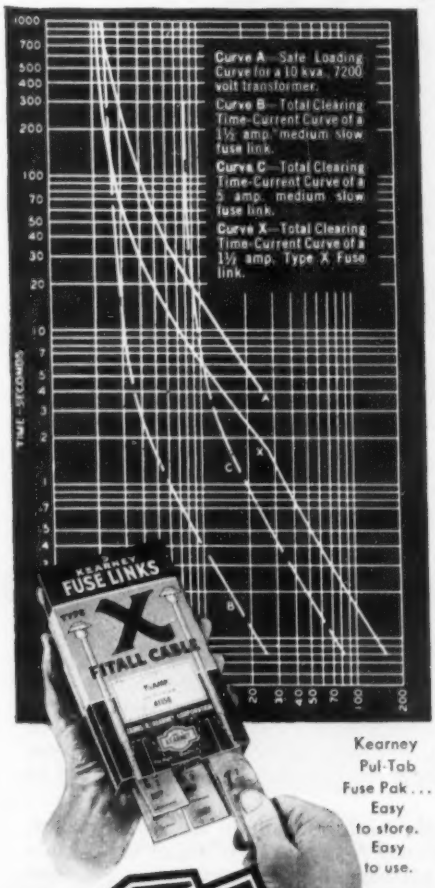
● Field studies are still being adjusted to new cost allocation plan for multipurpose projects agreed on last April by Interior Department, Federal Power Commission, and Army Corps of Engineers, Assistant Interior Secretary Fred G. Aandahl announced. He stated process of changing reports over to new system will take time.

OUTAGES DROP LOWER and LOWER

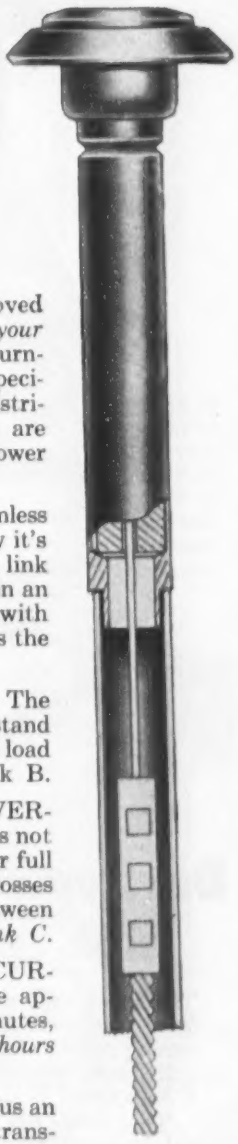
when You PROTECT Your System with

KEARNEY TYPE X FUSE LINKS

Safe Overload Protection plus Extra High Surge Capacity


Curve A—Safe Loading Curve for a 10 kva., 7200 volt transformer.
Curve B—Total Clearing Time-Current Curve of a 1½ amp. medium slow fuse link.
Curve C—Total Clearing Time-Current Curve of a 5 amp. medium slow fuse link.
Curve X—Total Clearing Time-Current Curve of a 1½ amp. Type X Fuse link.
TIME - SECONDS
KEARNEY FUSE LINKS
TYPE X
FITALL CABLE

Kearney Pul-Tab Fuse Pak . . . Easy to store. Easy to use.



KEARNEY Type X Fuse Links have proved that they will cut *your* outages, reduce *your* troubleshooting expense, keep *your* meters turning during peak revenue periods. Designed specifically to match the safe loading curves of distribution transformers, Type X Fuse Links are saving thousands of dollars monthly for power companies all over the United States.

You are wasting money every time a harmless temporary overload blows a fuse. That's why it's a dollar-and-cents necessity to use a fuse link which provides service continuity yet fuses in an instant at the danger point . . . and does this with no sacrifice in surge capacity. The Type X is the answer. Here's why . . .

PROVIDES HIGH SURGE CAPACITY. The fuse curves show that the Type X will withstand a transient surge of 25 times transformer full load for *20 times longer* than medium slow link B.

OPENS HARMFUL EMERGENCY OVERLOADS. Note how curve for fuse link C does not cross loading curve until 9 times transformer full load. The Type X curve extended upward crosses at 2.2 full load thus providing protection between 220% and 900% *not obtained with fuse link C.*

MAINTAINS SERVICE DURING RECURRENT OVERLOADS. The Type X curve approaches the vertical at around 5 to 15 minutes, thus *will carry up to 175% of rating for 2 hours or longer.*

We'll be glad to send you free fuse curves plus an easy-to-use celluloid safe loading curve for transformers. Write today to Dept. FL-1.

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new—

Developed to provide fast arc interruption on both high current faults and low current switching

The interrupting unit consists of the familiar *Turbo Ruptor* device supplemented by an oil jet arrangement. The contact structure combines a tulip type stationary contact with a bayonet and a high speed sickle contact.

This device has been tested from line switching values to 10,000,000 kva in combination of field and laboratory tests. It is but one feature of the outstanding BZO line of breakers — the line that also offers mechanically trip-free pneumatic or *Pneu-Draulic* operating mechanisms, and complete assembly and mechanical testing prior to shipment.

For complete information on the BZO breaker, call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4347

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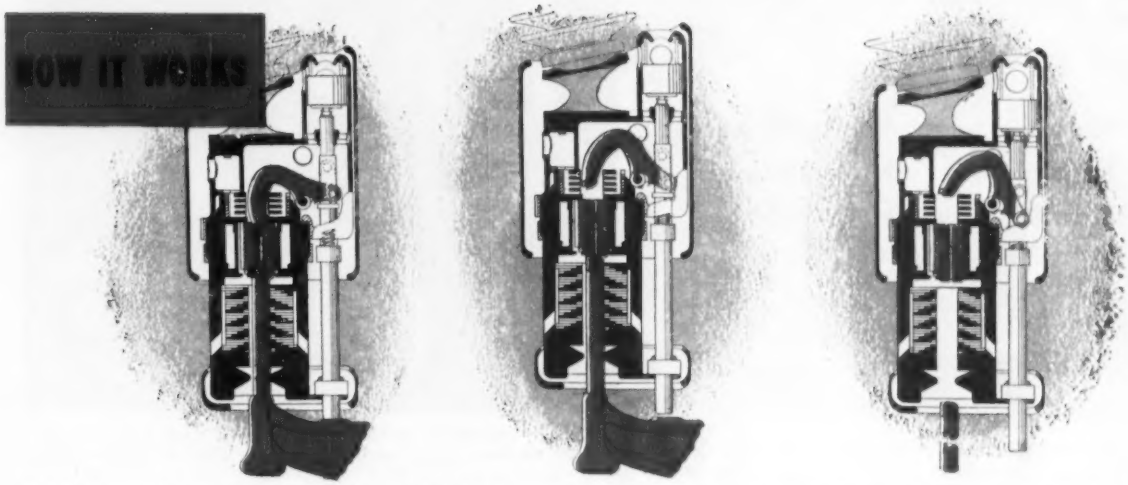
ALLIS-

"Turbo Jet" Interrupter

HOW IT WORKS

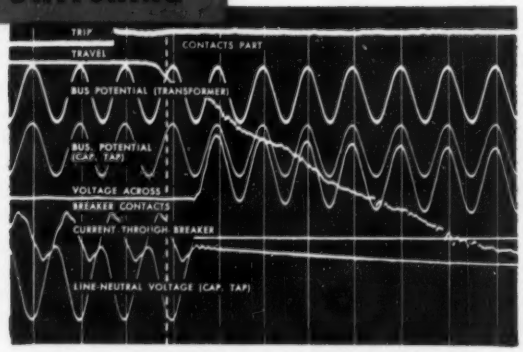


CLOSING — As cross-head and bayonet move upward to close, pushrod is forced upward to charge oil jet activator, and close upper contact. Simultaneously, piston permits oil to pass into upper chamber through a disc valve. Upper and lower movable contacts make contact with stationary element and breaker is closed.

OPENING — Cross-head is driven downward by accelerating spring. Upper contact opens and activator forces oil jet through laminated grid across arc path. Lower contact enters helical passage drawing arc which gasifies a portion of oil, forming a gas bubble. Oil swirls against lower portion of arc and disrupts it.

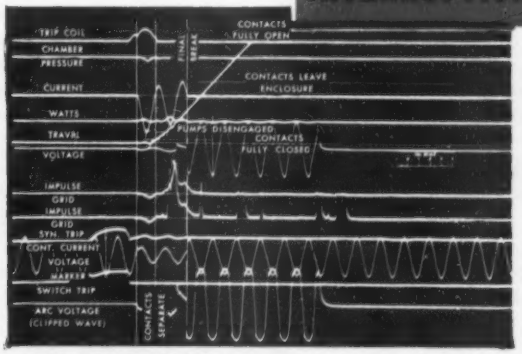
The increasing bubble pressure in lower chambers forces dielectrically unimpaired oil to swirl through arc path, preventing reestablishment of the arc. Complete withdrawal of bayonet from throat permits high pressure gas bubble to escape. *Ruptor* chamber refills with oil through refill holes in hood.

LOW CURRENT SWITCHING



Here's 187.8 mile line dropping test. Interrupting time was 1.71 cycles. No restrike.

HIGH CURRENT INTERRUPTION



In this test 46,400 amperes interrupted in 2.60 cycles — 122 percent ampere rating.

CHALMERS

A-C ALLIS-CHALMERS

- Minmized aggregate alkaline reactivity
- Reduced concrete temperature rise
- Minimized cracking of concrete
- Improved concrete workability
- Slowed initial set of concrete

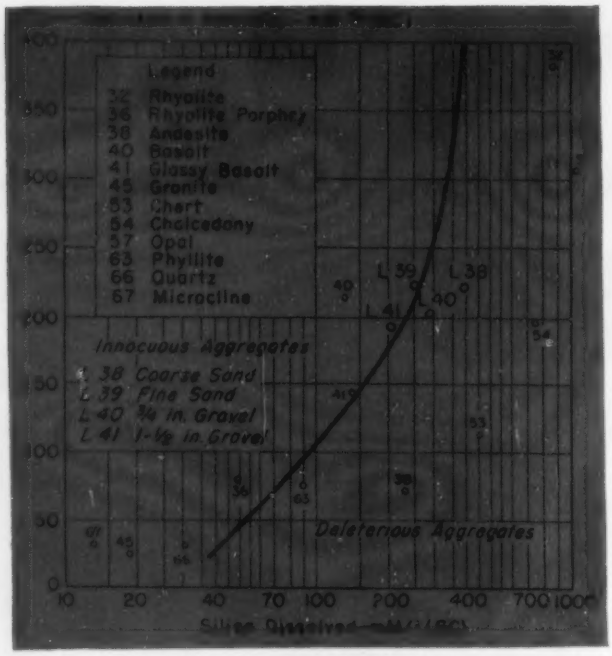


FIG 1—CHEMICAL TESTS ON AGGREGATE taken from river bed near Guayabo project indicated aggregate would be alkali reactive

Benefits to Guayabo Project Justify

E. MONTFORD FUCIK, Executive Vice President, Harza Engineering Co, Chicago, Ill.

Use of flyash in the concrete for the Guayabo hydroelectric project in El Salvador, Central America, appears to have been justified despite a higher delivered cost than that for the cement it replaced. Flyash content of the 250,000 cu yd of concrete poured ranged up to 25% of the weight of the cement. The dam of concrete gravity type is 213 ft high. The crest of the main river section is 330 ft long, and total crest length including abutment sections is about 1,500 ft.

Reasons for Using Flyash . . . Aggregate for the concrete was from a river bed deposit. Tests indicated that it would be alkali reactive (Fig 1). As no other suitable aggregate was within economical hauling distance, it was used; but precautions were taken to inhibit its reactive tendency. Among these was the use of flyash as a pozzolan admixture to replace some of the cement.

Decision to use flyash as the pozzolan was reached only after other local materials and the cost of importing pozzolans other than flyash from the United States had been investigated. Specifications were then written to include flyash, but they also provided that the contractor could use any other pozzolan which met test requirements. The contractor investigated but ended up by using flyash.

Another point which influenced the use of flyash was that in the tropics concrete has a high placing temperature. It is therefore desirable to reduce the cracking upon cooling. Cooling the aggregates and mixing water were considered but proved too expensive. Therefore, it was decided that replacement of about a fourth of the cement with a pozzolan would make it possible to elminate any special cooling measures.

Specifications and Mix . . . Bulk of the mass concrete was placed with a 25% replacement by weight of cement in the mix. The total cement and flyash content, with a 6-in. maximum size of aggregate, was about 1 bbl per cu yd so that one sack of flyash and three of cement were used per cu yd. These proportions varied somewhat, but the total cement and flyash content for the mass concrete was very close to four sacks per cu yd throughout the job.

While no physical or chemical specifications had been written, the flyash specified had been used in large quantitites by the U. S. Bureau of Reclamation in the Hungry Horse Dam. However, substitutions were permitted because the specified flyash source was unable to supply all of the requirements.

Shortly after the Guayabo project had been started, the ASTM took steps toward establishing a flyash specification. The U. S. Bureau of Reclamation and the tentative ASTM specifications for flyash are shown in the accompanying table. Flyash used on the Guayabo project passed both of these.

The percentage of flyash used was reduced considerably or flyash was eliminated entirely for the structural concrete, such as beams and columns in the powerhouse. Ob-

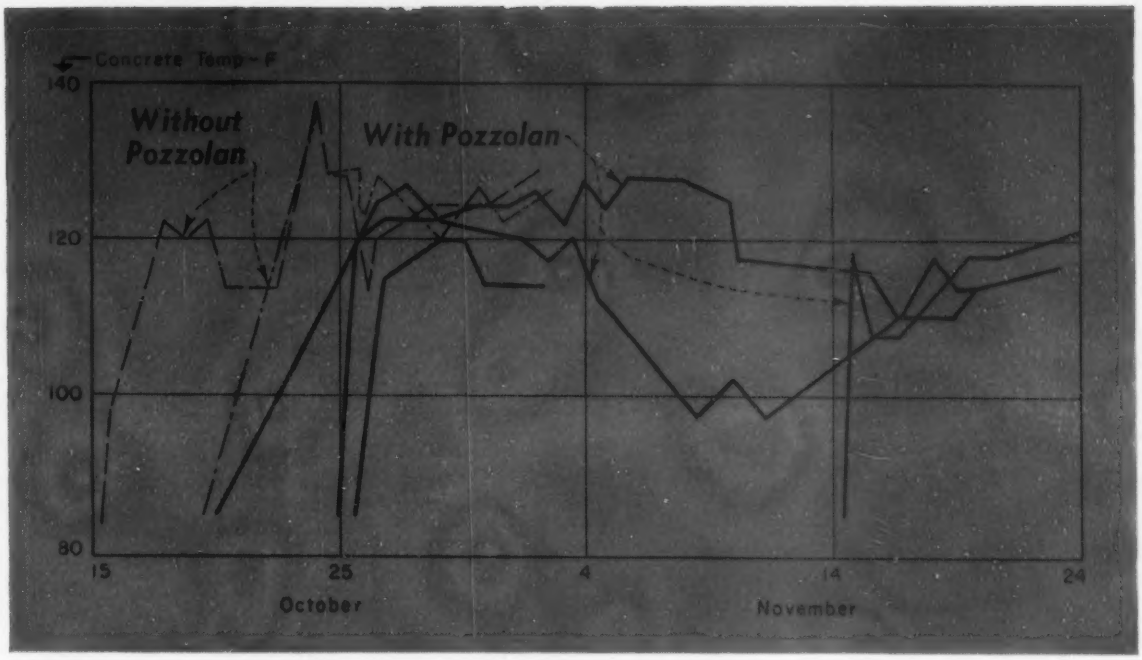


FIG 2—CONCRETE TEMPERATURE RISE was less for mixes having flyash than for mixes without flyash. This is believed to be one reason that there has been little cracking. Less heat rise also eliminated the need for special measures to cool aggregate and mixing water

Cost of Adding Flyash to Concrete

servations of the dam after a year indicate that it is remarkably free from cracking.

An effort was made to determine the difference after placing in the heat rise of concrete containing flyash and that without it. Fig 2 contains some of the temperature curves and shows that there was considerable less temperature rise for the former than for the latter. But results are insufficient to make possible any quantitative conclusions.

Absence of cracking in the dam also, it is believed, indicates that there is no bad effect from any alkali reaction with the aggregate. Flyash cannot be given all the credit because the cement had a very low alkali content (about 0.3%). Other tests have indicated that cements having an alkali content of less than 0.5% do not cause deleterious reactivity.

Observed strengths of the concrete cylinders indicated that the flyash caused a somewhat lower strength for the seven-day tests but the same at 28 days (2,800 lb).

Other Benefits of Flyash . . . Other benefits of the flyash were greatly increased workability and much slower initial set. One additional effect, caused apparently by the high specific surface or fineness of some of the flyash, was the increased amount of air entraining agent required to obtain the specified 3% air. Vinsol resin was used as an air entraining agent. It was found that from four to six times as much was required to obtain the 3% air with flyash as without it.

Specifications for Flyash to Be Used in Concrete

Chemical Composition	USBR	ASTM
Silicon dioxide (SiO_2), not less than	40.0%	40.0%
Aluminum oxide (Al_2O_3), not less than	15.0%	15.0%
Magnesium oxide (MgO), not more than	3.0%	3.0%
Sulfur trioxide (SO_3), not more than	3.5%	3.0%
Loss on ignition, not more than	5.0%	10.0%
Moisture content, not more than	3.0%	3.0%
Physical Properties		
Fineness:		
Specific surface, sq cm per gram (Blaine meter), not less than	3,000	2,500
Material retained on 325 mesh sieve, percent, not more than	12	12
Compressive strength percent of control 28 days, not less than	85	85
Water requirement, not more than	103%	103%
(The compressive strength of the portland-pozzolan cubes at 90 days shall not be less than the strength of the same mixture at 28 days.)		
Reactivity		
Reduction of expansive reaction at 14 days, not less than	60%	60%

Workability of Atom Law Discussed

Forum meeting in New York analyzes difficulties involved in implementing the statute which makes new atomic industry possible

The realities of getting the new atomic industry off the ground were pointed up to American businessmen recently by those now working to make a practical instrument of the new atomic law. The experts emphasized the unpleasant facts—the unique industrial problem, high investment costs, federal regulation. They instilled a sense of caution in some 500 executives from leading U. S. firms, but bolstered their confidence in the commercial possibilities of the new science.

The occasion was a meeting of the Atomic Industrial Forum, Inc, at New York's Plaza Hotel. There, the representatives discussed with their colleagues for two days their worries over the difficulties involved in making the new atomic law workable, in setting up the administrative machinery under which the U. S. businessman will be able to participate in the development of a new industry.

The Job of Implementation

At the end of those two days, this impression was gained: For the next few months, at least, there seems to be little chance that American industry as a whole can get its foot in the door of the atomic energy field, except on an experimental and costly basis, in power generation.

The experts were agreed that the new law was only the first—albeit the big—step toward opening the atom to commercial exploitation. But they emphasized the time-consuming work to be done to implement this statute.

A few industrialists at the meeting foresaw rapid developments in the science, particularly of atomic power. Arthur V. Peterson, assistant for atomic energy to the vice president, American Machine & Foundry Co, predicted that yearly private investment in research would match the government's spending in the field within ten years. This would go into "hundreds" of reactors, he believes. John W. Landis, of Babcock & Wilcox Co, saw the start of about 20 research or package reactors within two and a half years.

Cautious Attitude Scored

Others stuck to their original, longer-range time-table estimates. And one, Dr Lawrence Hafstad, director of Atomic Energy Commission's Reactor Development Division, tore into American industry for being so cautious about getting its feet wet in the atomic field. Dr Hafstad warned the businessmen they would lose out to more enterprising foreign producers in the world market if they did not start right now on a full-scale reactor building program.

Aside from these predictions, forum discussions were devoted chiefly to pinpointing the problems to be faced in bringing the new industry into being.

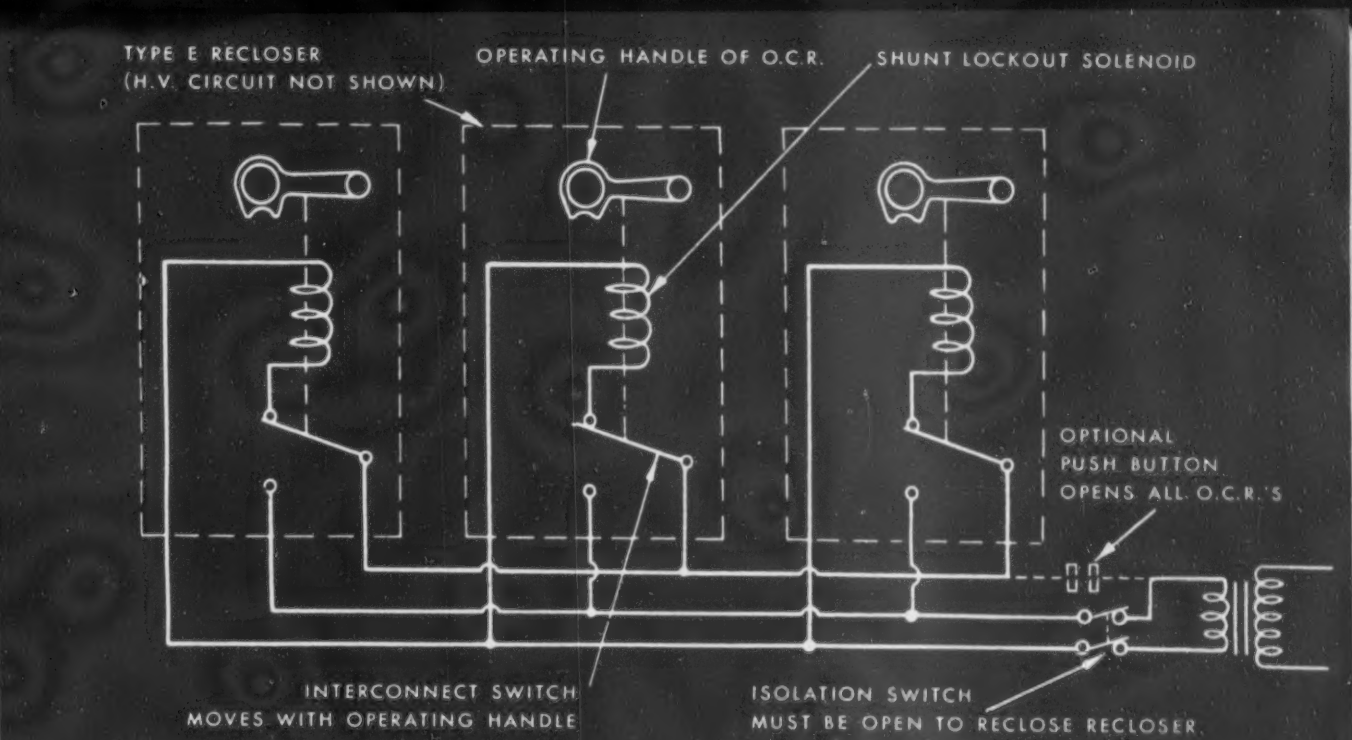
Dr T. Keith Glennan, former AEC commissioner and now president of Case Institute of Technology, said the basic problem to be solved is the extent of federal classification and dissemination of atomic information. This, he said, will decide in the long run the part industry can play in its new role as partner in the industry.

Some of the chief problems to be solved before a workable set of rules can be promulgated:

- Definitions of "production facility," "utilization facility," and component parts of each. According to William Mitchell, AEC general counsel, AEC still must make up its mind on these matters, but it is now clear that any equipment or device which falls into these categories will be subject to license, and particular licenses may include items in both facility categories. Most important components have been controlled under the McMahon Act, and AEC continues to use its previous criteria until new rules are formulated.
- Criteria for licensing for distribution of special nuclear material. Mitchell believes there will be an important relationship between charges for issuing special material, and prices paid by AEC for special material produced by licensees.
- Establishment of categories of licenses for operators of production and utilization facilities.
- Establishment of a "gray area" of classified information. U. S. criteria for this semi-restricted block of data to be made available to industry, but not to the general public, have been drawn up and are now the subject of discussions with the British and Canadians, who are parties to a tripartite agreement giving them a say on the scope of this gray area.
- Coupled with this is the problem of clearance. AEC must draw up in writing standards and specifications on civil service commission security checks on personnel in the program.
- Classification of patents. The new law reinstates the right to file certain applications previously prohibited. AEC will work with the patent office in this review. Compulsory licensing also must be regulated.

Foreign Operations

- Ground rules under which applications from U. S. firms wishing to cooperate with foreign firms or governments must be worked out, since AEC is to be involved deeply in any agreements with other nations.
- Determination as to the effect of the new law on operations abroad of U. S. firms. To be decided is whether American businesses may set up foreign operations, whether they may establish subsidiaries to carry on foreign-based atomic facilities.
- Determination of the role of the individual states in the field. It will be up to the states themselves to set up their regulatory machinery, but the commission still has to decide what the federal government thinks it must regulate, and what it thinks should properly be left in state hands.
- Determination as to the extent to which insurance for the industry will be needed, and the extent to which it will be available.



Wiring diagram shows shunt lockout solenoids as applied to three Kyle Type E 23 kv reclosers. If any one phase locks out, the solenoids automatically lock out the other two phases.

Solenoid for Kyle® Type E Recloser Prevents Prolonged Single-Phasing

New shunt lockout solenoid is now available on Kyle Type E reclosers to prevent prolonged single-phasing of three-phase feeder. The Type E recloser coils are rated from 5 to 100 amperes at 23 kv with high interrupting capacities of 2500 amperes at 14.4 kv, 1750 amperes at 23 kv.

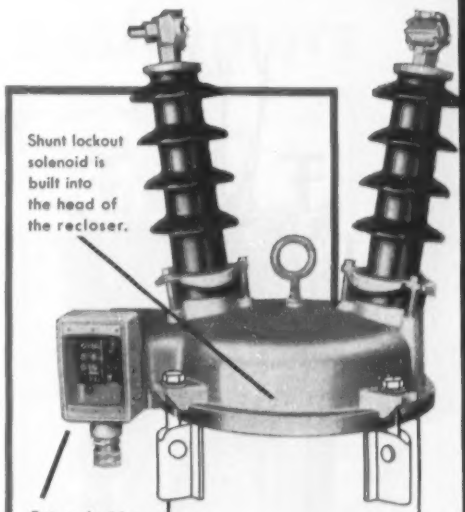
By **W. C. Wiechmann**
Application Engineer, Kyle Products Sales, Line Material Company

The shunt lockout solenoid, available on L-M's Kyle Type E recloser, is designed to trip the lockout latch and lock the recloser out. Electrical interconnection of the Type E recloser is made through the solenoid coils, thereby providing multi-phase lockout of the feeder. This multi-phase lockout will prevent a back-feed to a fault through the other phases —and eliminate prolonged single-phasing on three-phase equipment.

The shunt lockout solenoid is built into the head mechanism of the recloser. If any one phase locks out, the solenoid locks out the other two phases. The coil operates on 115 volt service and requires approximately 250 va per recloser. If an existing secondary is not available, a 1½ kva transformer is recommended. The device is an additional feature which is built in at the factory, on order.

The Kyle Type E is the only 23 kv recloser on the market. It has exceptionally strong construction and heavy insulation. The large contacts of finest arc-resisting material and the improved oil cross-blast method of arc extinction make the Type E an outstanding recloser for high-voltage application.

Get details on the Type E recloser and the multi-phase lockout, both of which have proved so successful in service. Ask the L-M Field Engineer for copy of bulletin on the Kyle Type E, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

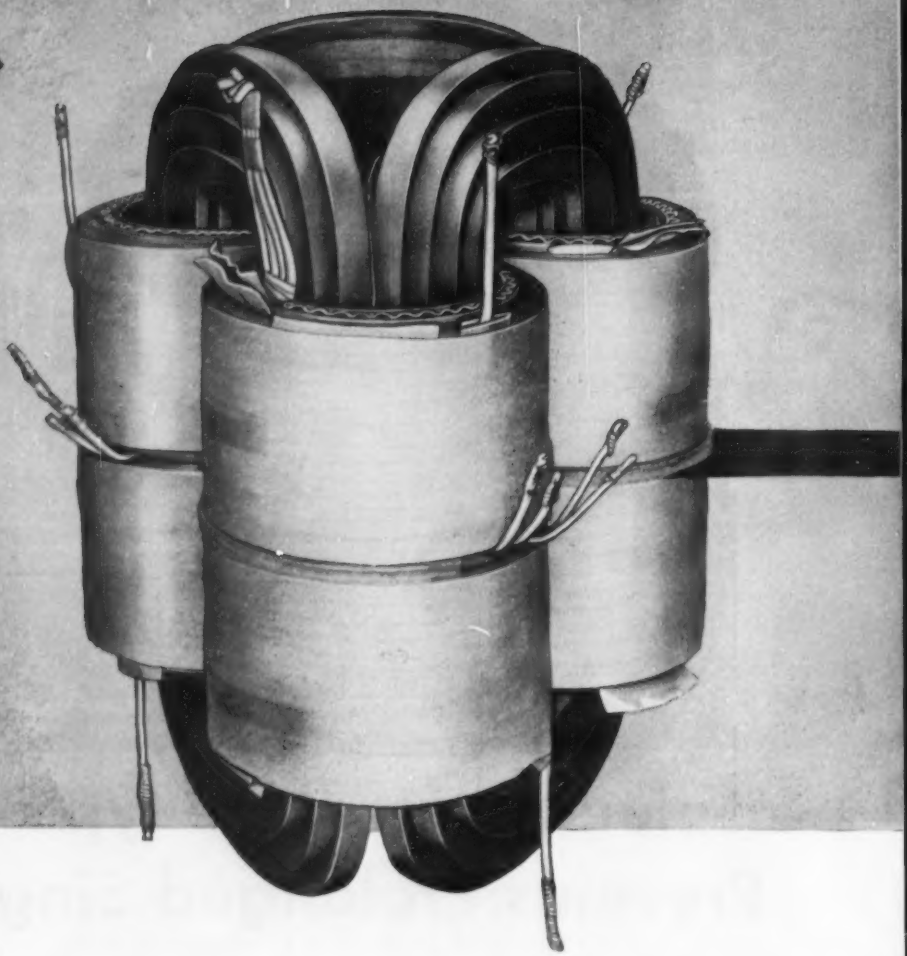

Shunt lockout solenoid is built into the head of the recloser.
External wiring terminal block with auxiliary switch terminal board. Grommet accommodates 1/16" to 7/16" O.D. cable.

197

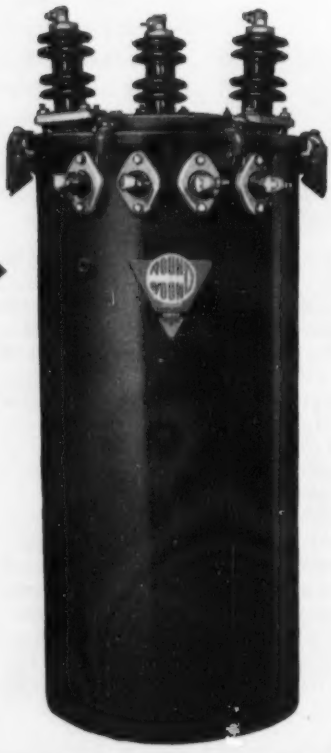
LINE MATERIAL Kyle® Reclosers

The L-M Tri-Wound core-coil configuration results in a compact and highly efficient structure. The inherent characteristics of the continuously wound core and the round coils offer distinct design and operating advantages.

The core structure consists of three continuously wound cores of oriented-grain silicon steel strip assembled into a balanced magnetic unit.



The new Tri-Wound is built to resist short-circuit forces. Note the strong steel frame and heavy clamping bolts. Sturdy maple blocks at top and bottom are tightened and clamped against the coil ends to prevent axial movement.



Completed Tri-Wound 3-phase transformer. The unit is smaller and lighter than L-M's previous type. The transformer provides all the well-known advantages of L-M's single-phase Round-Wound transformers.

Outstanding Characteristics of L-M Tri-Wound Transformers

High short-time overload capacity

Good regulation at all power factors

High impulse level with ample creepage distance and generous insulation

High short-circuit strength

Filled with ORTO®, L-M's oxidation-resistant transformer oil, inhibited for longer life

Available in sizes 9, 15, 30, 45, and 75 kva

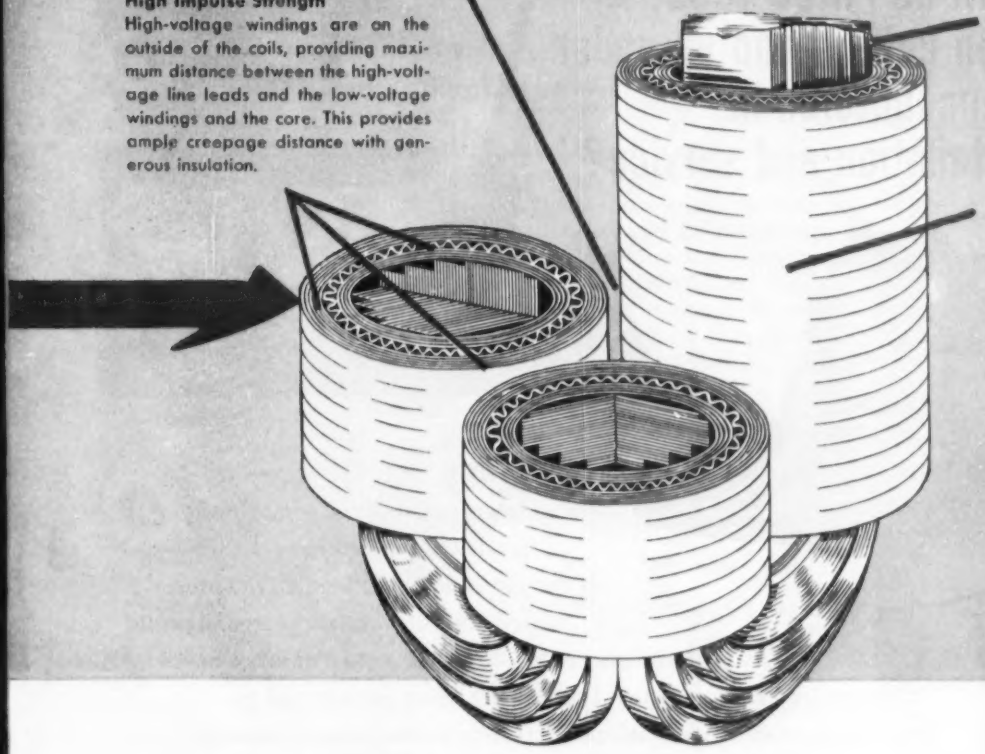
"Tri-Wound" and "Uni-Wound" are Line Material Company trade-marks.

High Short-Time Overload Capacity
Core clamps are designed to provide a chimney effect between the three coils. This chimney effect plus the exposed outer coil surfaces provides effective cooling. Oil ducts, located throughout the coil, contribute to uniform, efficient cooling.

High Impulse Strength
High-voltage windings are on the outside of the coils, providing maximum distance between the high-voltage line leads and the low-voltage windings and the core. This provides ample creepage distance with generous insulation.

Low Exciting Current
The continuously wound core of oriented-grain silicon steel strip provides a uniform flux path, thus permitting low exciting current.

High Short-Circuit Strength
Round coils naturally resist radial short-circuit forces without damage or distortion. Sturdy core clamps and strong blocking help prevent axial movement of the windings under short-circuit conditions.



For 3-Phase In 9 To 75 kva Sizes...

L-M's New Tri-Wound™ Transformers

Apply Round-Wound® principles to 3-phase construction to provide light weight and small size, high overload capacity, high short-circuit strength, high impulse strength.

By **JAMES G. EVERHART**
Chief Engineer
Transformer Division
Line Material Company

L-M's new *Tri-Wound* fills the need for a smaller, lighter 3-phase transformer that utilizes the full advantages of a continuously wound magnetic core and round coils. This new Tri-Wound transformer is now available in sizes 9 through 75 kva and in all voltage classes through 13,800 volts.

L-M's larger-sized 3-phase transformers are the new *Uni-Wound*, which provide Round-Wound's balanced performance in sizes from 112½ through 500 kva.

Continuously Wound Core

The Tri-Wound transformer consists of three cores, continuously wound of oriented-grain silicon steel strip. The bare cores are annealed after fabrication, and placed as shown in the illustration. Then round coils are wound directly onto the three core legs by L-M's exclusive winding process.

Tri-Wound is Smaller and Lighter

Integrating the core-coil assemblies into one unit provides a substantially lighter, smaller 3-phase transformer. For example, the 75 kva Tri-Wound is approximately 250 pounds lighter than previous designs. In addition, the over-all height of this new Tri-Wound unit has been reduced about 1½ feet, with very little increase in the projected floor space.

Balanced Performance

Performance characteristics of the Tri-Wound transformer have been coordinated to give good over-all balanced operation, with each characteristic being considered in its relationship to the over-all performance of the transformer.

Get Details of Tri-Wound Transformers

Ask the L-M Field Engineer to give you full details; or write Line Material Company, Transformer Division, Zanesville, Ohio. (Line Material Company is a McGraw Electric Company Division.)

192

LINE MATERIAL Transformers

a Transmission Engineer Asks—

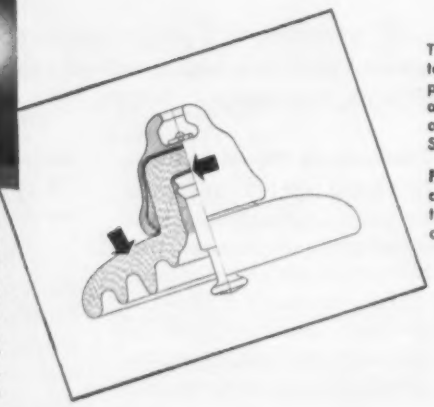
"How do PINCO 1060 suspension units stand up under impact blows encountered in installation and service?"

NO. 11 IN A SERIES

.....here's our Answer:

The ability of Pinco Suspension Insulators to withstand severe impact blows is attributed to the *rugged design of the porcelain body*, wherein the proper distribution of porcelain at critical points plus beaded edges produce a huskier section of sufficient strength to provide *extra* protection from impact blows encountered in installation or service. Additional protection is also provided through the use of a resilient pad between the porcelain and the top end of the pin. The cushioning action of this pad protects the porcelain from damage by impact on the end of the pin and relieves any stress which might occur.

Pinco Insulators of every type are continually subjected to tough laboratory tests approximating all possible conditions encountered in actual service. Typical of these is this routine test for impact strength made on random samples from production. Another example of Pinco's careful watchfulness over every detail, from design to completed product.



This sectional view of a Pinco 1060 Suspension Insulator shows its rugged design characteristics and husky porcelain section. Note location of resilient "shock absorbing" pad between pin and porcelain . . . another protective feature built into every Pinco Suspension Unit.

For complete electrical and mechanical specifications covering the Pinco 1060 Suspension Insulator, refer to page 65, Pinco Catalog No. 49. If you don't have a copy—write us.

The Porcelain Insulator Corporation LIMA, N. Y.

Sales Agents: JOSLYN MFG. AND SUPPLY CO. *Offices in Principal Cities*

PINCO INSULATORS

Suspension Insulators . . . Clamps and Fittings . . . Switch and Bus Insulators . . . Distribution and High Voltage Pin Types . . . Guy and Tree Insulators . . . Special Porcelain.

Welsh Is Elected President . . .

. . . of Southwestern Gas & Electric to succeed Frank M. Wilkes, who will serve as Louisiana utility's board chairman

J. ROBERT WELSH

J. Robert Welsh has been appointed president of the Southwestern Gas & Electric Co to replace Frank M. Wilkes, who is retiring from the top executive post to become chairman of the board. These changes become effective Nov. 1.

Filled Superintendent's Post . . . The newly elected president began his affiliation with Southwestern G&E in 1940 as superintendent of power. In 1945 he was named superintendent of operations. Three years later he was made a member of the board of directors, and was named a vice president in 1949. Earlier this year he was named vice president and general manager, filling these positions until the recent appointment to the presidency.

A native of Illinois, Welsh graduated from the University of Illinois' college of engineering. Upon graduation he became associated with L. E. Myers Co, electrical construction contractors. He was serving this firm as chief engineer when he went to Southwestern Gas & Electric at Shreveport, La.

Welsh is a member of the board of directors of the National Association of Electric Companies, and chairman of the operating committee of the Southwest Power Pool.

Utility Veteran . . . Wilkes, a veteran of 46 years in the utility business, joined Southwestern G&E in 1940 as vice president and general manager, becoming president two years later. From 1923 to 1940 he had been an executive with Arkansas Power & Light Co, serving as vice president and general manager when he resigned to join Southwestern G&E.

The new board chairman, who is known as "Captain Wilkes," was graduated from the University of Kentucky with an electrical engineering degree.

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W. L. Bradley, Eldorado, Ill., has been elected president of the Association of Illinois Co-operatives.

A. C. Meixner and Robert A. Warren have been appointed assistant sales manager of apparatus products and manager of meter sales for the Meter Division, respectively, for the Westinghouse Electric Corp. Meixner joined the company in 1930, while Warren joined the graduate student training program at Westinghouse in 1940.

Ernest Hathaway has been named director of the newly made Industrial Development Department of the Central Vermont Public Service Corp.

Daniel J. McLane, Jr, has been appointed manager-sales of General Electric Co's Large Steam Turbine-Generator Department. He came to GE in 1919.

Ralph H. Wright, plant engineer for Ohio Edison Co in Youngstown, has become production engineer at the Pennsylvania Power Co plant in Newcastle, Pa.

Hans U. Lieberherr, Emil Grieshaber, and Ralph Miller have received new appointments as director of engineering, director of projects development, and consultant and director of supairthermal development and application, respectively, for the Nordberg Manufacturing Co. Lieberherr joined the company in 1949, Grieshaber in 1915, and Miller in 1945.

Pat Allen has been named Richmond district manager for Kentucky Utilities Co, succeeding **George T. Fawkes,** retired.

GEORGE R. WOEHLER

Southern Indiana G&E Elevates G. R. Woehler

George R. Woehler, secretary of Southern Indiana Gas & Electric Co, has been elected vice president and comptroller to succeed Charles E. Oswald, who has retired after 48 years of continuous service with the organization. Oswald, however, will continue as a director of the company.

In another appointment, Leonard H. Meyer was named secretary to replace Woehler. Meyer joined the organization in 1936 as an accountant.

Woehler has been with Southern Indiana G&E for 35 years, filling numerous supervisory and executive accounting positions. He was made assistant secretary and assistant treasurer in 1945 and was elected secretary in 1949.

Oswald's service record began in 1907 when he joined a predecessor, Evansville Gas & Electric Light Co. He was elected treasurer of Southern Indiana G&E in 1916, becoming secretary in 1921. He became a director in 1932 and assumed the present posts in 1948.

(*More Personals on page* 41)

CORONA *free* DESIGN

Stretches

HERE'S A TRANSFORMER THAT WILL STAY YOUNG

CORONA AGES TRANSFORMERS prematurely, produces local heat and chars insulation. Eventually insulation becomes a conductor, causing transformer failure.

Corona-free design of Allis-Chalmers power transformers means that corona will never cut into this transformer's life. The harmful effect of corona will never reduce return from this transformer investment.

Economical FORCED OIL COOLING

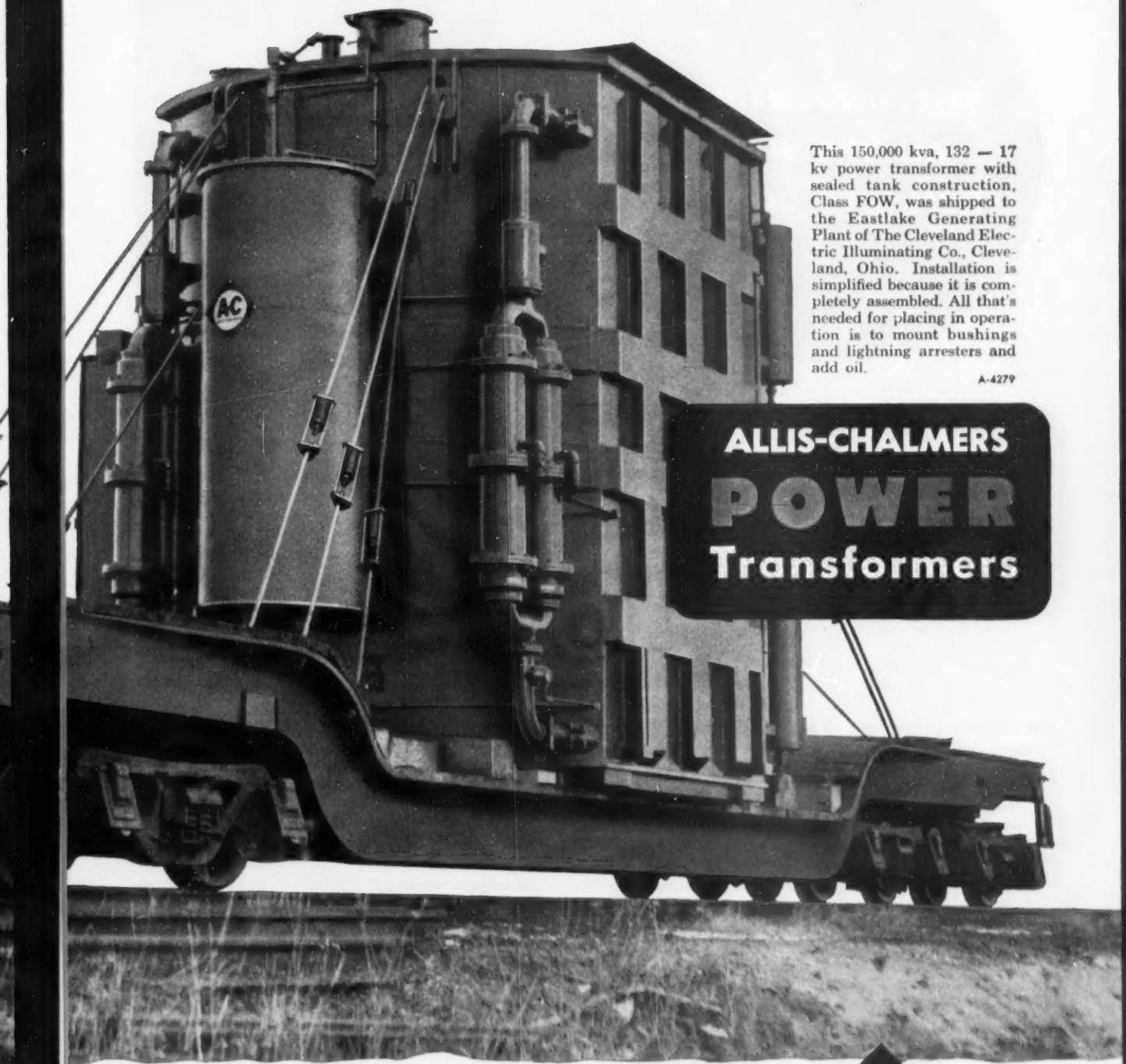
In this transformer, two *Electro-Cooler* units (visible on left side of transformer) remove warm oil from the top of the transformer tank, circulate it through water-cooled heat exchangers, and return it to the lower portion of the tank. Forced oil cooling of power transformers was first made economical by Allis-Chalmers development of the *Electro-Cooler*.

The *Electro-Cooler* is an entirely self-contained, self-supporting, and self-lubricated oil-immersed motor and pump on a single shaft. It is totally enclosed in a single casing and sealed. Two ball bearings support both pump and motor. There are no glands, stuffing boxes, or oil leaks. The three-phase squirrel-cage motor has no starting brushes, no commutator, or other wearing parts.

Electro-Cooler is an Allis-Chalmers trademark.

ALLIS-

Investment Dollars



This 150,000 kva, 132 — 17 kv power transformer with sealed tank construction, Class FOW, was shipped to the Eastlake Generating Plant of The Cleveland Electric Illuminating Co., Cleveland, Ohio. Installation is simplified because it is completely assembled. All that's needed for placing in operation is to mount bushings and lightning arresters and add oil.

A-4279

ALLIS-CHALMERS
POWER
Transformers

CHALMERS

A-C ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN

SELF-SUPPORTING ALL THE WAY FROM 3 TO 300 KV

This exclusive feature of Thorex lightning arresters effects major savings in design and installation, and stabilizes electrical grading at higher operating voltage levels

Wet test for internal electrical grading being conducted in the O-B High Voltage Laboratory on a Thorex MPR lightning arrester rated at 300 kv, for system operating voltages up to 375 kv.

★ Only support required for Thorex lightning arresters is a simple foundation. Elaborate structures and insulated bracing are eliminated. These design and installation expenses can easily exceed the cost of the arrester units, themselves.

★ Un-desirable distortion of proper voltage division between arrester units can be introduced by bracing or supporting insulators. This is the result of surface leakage currents over the insulators connected at intermediate points in the arrester stack. Freedom from such intermediate support characterizes the complete Thorex lightning arrester range, from 3 to 300 kv.

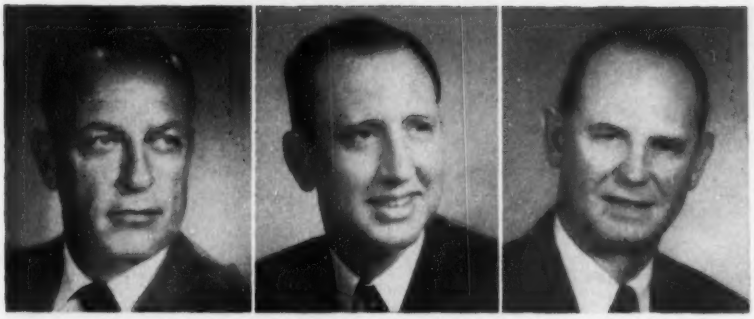
★ Simplified design permits radical reduction of station space requirements for the Thorex.

★ These are *three more* sound reasons for specifying Thorex lightning arresters--three more reasons added to the best all-around protection your money can buy!

Ohio Brass

MANSFIELD OHIO, U.S.A.

4425-H



DON WILLIS WALTER T. LUCKING T. A. PHILLIPS

Arizona PS Names 3 New VPs

Willis, Lucking, and Phillips are appointed to executive posts. Groh, McGregor, and Titus get new assignments

Arizona Public Service Co has announced several major changes in its executive organization.

Newly elected officers of the company include Don Willis, vice president in charge of sales; Walter T. Lucking, vice president in charge of operations; and T. A. Phillips, vice president in charge of engineering.

Assigned New Duties . . . In other changes, George H. Groh moves up from vice president in charge of operations to vice president and assistant to the executive vice president in charge of planning and production. Douglas B. McGregor, formerly vice president in charge of sales and personnel, becomes vice president in charge of personnel, with added duties in the field of taxes and property evaluation. Claire Titus, who was made assistant to the executive vice president in 1953, has been appointed assistant to the president and general manager.

Willis, a native of Indiana, became associated in 1930 with Central Arizona Light & Power Co, a predecessor of Arizona Public Service. Since then he has advanced in advertising and sales promotion work, serving as general sales manager for the past six years. He is a member of the Pacific Coast Electric Association, Pacific Coast Gas Association, National Reclamation Association and co-chairman of the Public Information Program's Workshop Conference.

Power Supply Experience . . . Lucking, a mechanical engineering graduate of the University of Colorado, has been connected with the utility industry for the past 19 years. He joined Arizona Edison Co, one of two companies merged to form Arizona PS, in 1950. Lucking, who has considerable experience in power production and power supply, for the past two and a half years has served as general superintendent in charge of power supply. He holds membership in PCEA, American Society of Mechanical Engineers, and NRA.

Phillips, a native of Arizona, received an electrical engineering degree from the University of Arizona in 1936. Shortly after graduation he became affiliated with an Arizona PS predecessor. He has progressed through engineering work to superintendent of electric distribution, general superintendent of operating and engineering, and chief engineer, a post he has held since 1948.

He is a member of the American Institute of Electrical Engineers, ASME, PCEA, PCGA, Institute of Radio Engineers and the Southwest Committee on Utility Radio.

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A. E. Harold Fair, Toronto, Canada, has been elected executive vice president of the Brown Co and the Brown Corp. He came to the company in 1946. He will have his headquarters in Boston, Mass.

Emerson A. Armstrong has been named consultant on public utility products and sales of Electro-Motive Division of General Motors Corp. Armstrong was retired by Commonwealth Edison Co on July 1. He had been manager of sales for Commonwealth since 1952, when that company absorbed the Public Service Co of Northern Illinois. He was manager of industrial sales for Public Service from 1923 to 1952.

J. D. Doyle has been named budget officer of the Arkansas Power & Light Co, filling the vacancy created by **S. W. Kittleman** who has retired. Doyle joined Arkansas Power & Light in 1928 as timekeeper with the general office.

Sam Ruvkun and **J. E. Hughes** have been appointed assistants to the vice president of the Kaiser Engineers Division of Henry J. Kaiser Co, Oakland, Calif. Prior to this appointment, Ruvkun was a project engineer on various assignments. Hughes, for the past seven years office engineer handling administrative duties, joined the Kaiser organization in 1941.

Rook Made Vice President

E. C. Rook has been appointed vice president and general manager of the Blaw-Knox Equipment Division of the Blaw-Knox Co, succeeding G. L. Dirks, who resigned. He recently retired as a captain in the U. S. Navy. Rook spent 34 years in the naval service. In addition to his studies at the Naval Academy and Naval War College, he received a master's degree in metallurgical engineering at Carnegie Institute of Technology.

OBITUARY

William L. C. Lang, 47, commercial sales manager of Eastern Shore Public Service Co of Maryland for the past ten years, died Sept. 22 at Salisbury, Md. Previously he held that post with Delaware Power & Light Co, parent of Maryland utility.

Karl E. Traxel, 51, superintendent of the Boonville, N. Y., Electric & Water Co, died on Sept. 20.

Ashton B. Cooper, 70, president of Ferranti Electric, Ltd, died Sept. 15 in Toronto. He was co-founder and first president of the Canadian Electrical Manufacturers Association.

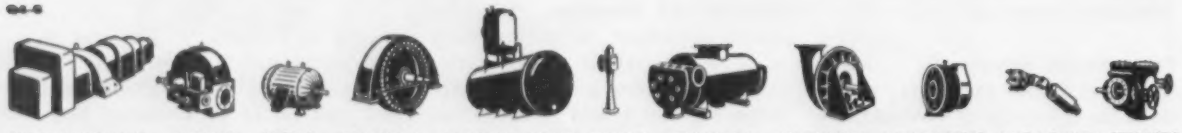
How to duck a HOUSING PROBLEM

Elliott outdoor-splashproof (weather-protected) motors have projected a new economy into the industrial picture.

A big motor must breathe. It needs a constant stream of cooling air, clean and dry, through its coils and windings. For outdoor service you can, of course, use a standard open motor and build housing over it. Or you can install a totally-enclosed motor. Both means are unnecessarily expensive. The happy, economical alternative is this Elliott outdoor motor, which breathes outdoor air, but rejects moisture, sleet, snow, dust, dead leaves, even insects and small animal life. An ingenious arrangement of sheet steel baffling, screens and filters does the trick.

Elliott outdoor motors are a typical product of the sound engineering and development work which in half a century has made the Elliott Company one of America's important builders of a broad line of equipment for power and process use. For complete details on any of this equipment, contact your local Elliott field engineer, or write the Elliott Company, Jeannette, Pa.

ELLIOTT Company



TURBINE-GENERATORS · TURBINES · MOTORS · GENERATORS · DEAERATING HEATERS · EJECTORS · CONDENSERS · COMPRESSORS · TURBOCHARGERS · TUBE CLEANERS · STRAINERS

PEA Discusses Management

Executives of four major Pennsylvania utilities participate in symposium on industry progress, problems, and plans

Management problems were the keynote of Pennsylvania Electric Association's 47th Annual Meeting held recently at Pittsburgh. Nearly 700 delegates heard business leaders discuss the course ahead.

Power requirements exceeding 38 billion kwhr annually were predicted for the steel industry 20 years from now by B. F. Fairless, board chairman of U. S. Steel Corp. This constitutes a 7.5 billion increase over today's consumption.

Fairless noted that steel today uses upward of 7% of utility power production. And mechanized coal mining, use of Taconite and Jasper ores, electric furnace refining, additional rolling and finishing operatings, and electrolytic tin-plating all tend to boost power needs. Electric smelting, however, he said, is far in the future because power cost is too high.

The steel company executive urged closer cooperation between steel and utilities. As an example he cited plans for a $6-million steam power plant to be jointly owned by Upper Peninsula Power Corp and Cleveland Cliffs Steel Co.

Utility Executives Present Symposium . . . An executive symposium on utility progress, problems, and plans was another highlight of the meeting. Participants were leaders of four major Pennsylvania utility companies.

Electrical demands exceeding six times present levels within 50 years demand large scale research, said R. G. Rincliffe, Philadelphia Electric Co. He cited Duquesne Light Co's agreement with AEC to operate the first full-scale nuclear power plant as "an extremely important forward step." Other Pennsylvania utilities in the Dow Chemical-Detroit Edison Co research group seek by breeding to make nuclear fuel competitive with commercial fuels.

New Studies Asked . . . Rincliffe proposed new studies in conventional steam plants to evaluate single-shaft units to 300 Mw with super-critical pressure and double reheat. Automation will assume growing importance, he predicted.

Economies are achieved by concentrating maintenance facilities at one shop for system wide generating equipment, Rincliffe continued. Increased flexibility and more effective use of trained manpower cut equipment outage time to achieve important savings in replacement energy cost. Storm-proof construction is being re-evaluated, and plans have been developed for prompt emergency restoration, he said.

Utility management must find better business methods, said P. H. Powers, West Penn Power Co. Selling must be more intelligent, with long range planning, better evaluation, periodic review, intensive comparison of sales costs with net earnings.

Selective selling should be planned to improve load factor and profit factor, Powers continued. Poorly conceived selling combined with an unsound rate program could be hazardous.

"Power to regulate rates is the power to preserve—or to destroy," warned P. A. Fleger, Duquesne Light Co. Investors today are more numerous, better informed, and highly selective. In recent years they have recognized that the climate of rate regulation dominates their analysis.

Among adverse factors cited by Fleger were failure to allow full current reproduction cost in the rate base and delay in granting rate increases. Favorable factors are decision to permit recovering by depreciation the full original cost and new provisions of the 1954 Internal Revenue Code.

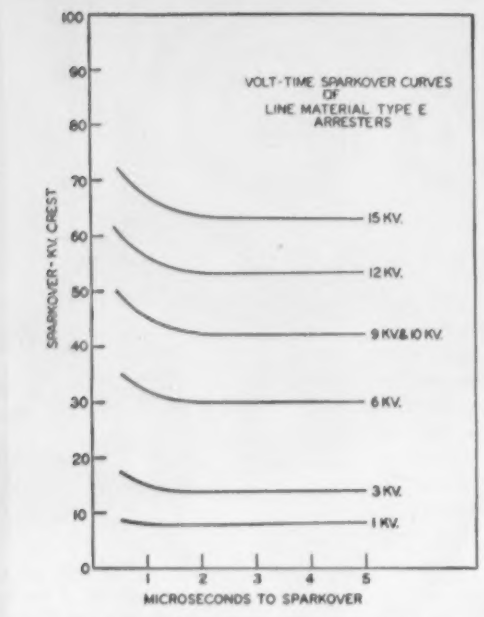
Need for Publicity . . . "Human problems, like life itself, are forever being renewed," sounded the keynote of a paper by C. E. Oakes, Pennsylvania Power & Light Co. His paper, read by H. L. Ferguson, PP&L vice president, advocated publicizing the ability of corporate enterprise to advance public welfare.

Oakes attributed the apparent lack of preparation among young people

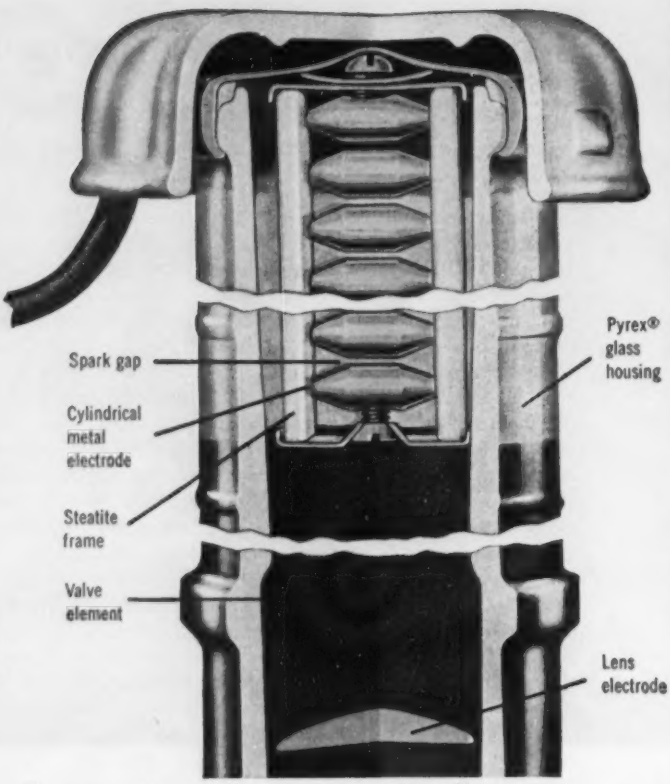
(*Continued on page 46*)

BENJAMIN FAIRLESS, U. S. Steel chairman, told PEA steel industry's use of electricity would increase greatly over next 20 years

PARTICIPATING in symposium were H. R. Ferguson, Pennsylvania P&L; P. H. Powers, West Penn Power; R. G. Rincliffe, Philadelphia Electric; and Philip Fleger, Duquesne Light



Volt-time curves of arrester sparkover on impulse. These curves illustrate the quick response of the arrester to lightning surges. At all points of the curve the impulse sparkover of the arrester is far below the insulation strength of the distribution equipment being protected.



How L-M's Type E Valve Arrester Balances 60-Cycle Sparkover and Impulse Sparkover

By **GEORGE W. COOPER**
Manager
Protective Equipment Sales
Line Material Company

L-M's Valve Arrester spark gap is designed to prevent unnecessary 60-cycle sparkover of the arrester to harmless switching surges, whereas the low and consistent impulse sparkover brings the arrester into operation quickly and dependably in case of a dangerous lightning surge.

Precision Spark Gap

The spark gap is made of electrode members, accurately spaced and supported by a strong machined frame of high-grade steatite. The gap is so designed that its 60-cycle sparkover value is approximately 1.8 times the rating of the arrester under wet conditions. This is sufficient to keep normal switching surges from sparking over, and provides a path to drain off higher switching and lightning surges.

At higher surge voltages the combination of the metal electrode and the steatite produces an instantaneously ionized, electrically fast path. This combination, together with the cylindrical design of the electrodes, forms a ladder gap unit with a low impulse sparkover.

High Discharge Capacity

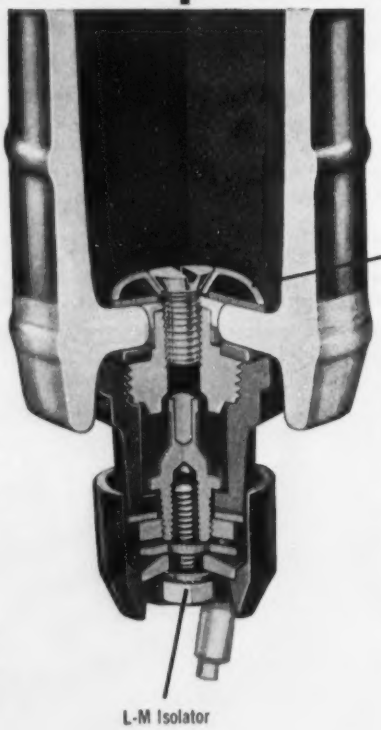
L-M's exclusive bonded valve element combines low IR drop with more than enough capacity to handle the 65,000-ampere surges prescribed by NEMA. It acts as a valve to limit power follow current to a negligible value.

The result of all these features is that the L-M Type E arrester is outstanding in the protection it provides, in its long life under severe lightning conditions, and in its permanent, never-changing characteristics. L-M valve-type arresters amply meet all NEMA standards.

In addition, L-M's "ISOLATOR" provides positive assurance against grounding feeders, by disconnecting the ground lead from the arrester, if the arrester should ever become damaged.

Get This Bulletin

Get the whole story of L-M arrester performance and application. Ask the L-M Field Engineer for a copy of Bulletin LA2; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



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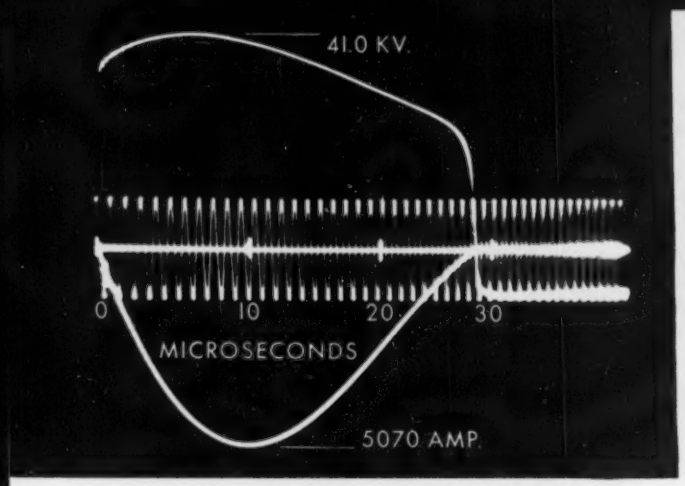
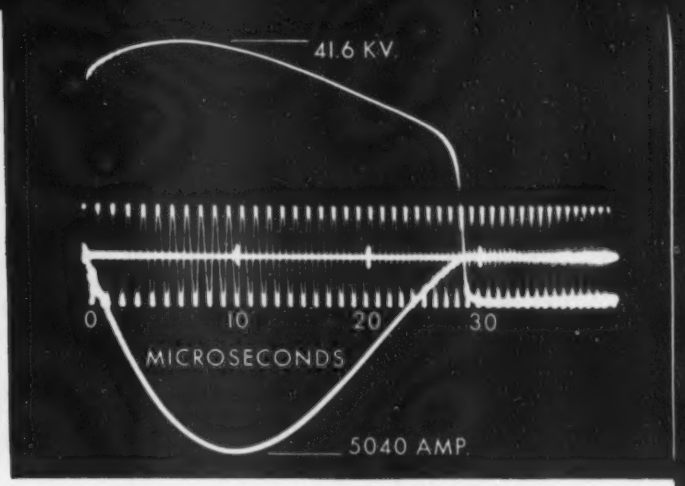
LINE MATERIAL *Lightning Arresters*



Before test: Oscillogram illustrates the electrical characteristics of an L-M 9 kv arrester before the AIEE Operating Duty Cycle Test of thirty operations using a 5000 ampere surge and 60-cycle follow current at the rated voltage of the arrester.



After test: Oscillogram of electrical characteristics of the same arrester after AIEE Operating Duty Cycle Test, illustrating the unchanging high degree of protection that is maintained throughout the life of the arrester.

How L-M's Type E Valve Arrester Provides Low IR Drop, High Discharge Capacity

By **GEORGE W. COOPER**
Manager
Protective Equipment Sales
Line Material Company

L-M's exclusive design of valve arresters provides the optimum amount of valve material to give balanced performance. The valve material must provide a low impedance path for surge currents to assure low IR drop, provide ample surge current capacity, and function as a valve to limit follow current until it is interrupted by the series gap.

Several factors contribute to the high discharge capacity or ability of the Type E arrester to handle heavy strokes of lightning without damage.

L-M's Molded-in Valve Element

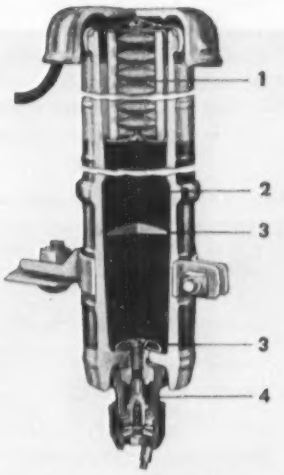
"Granulon," the valve material, was developed as the result of years of experience and research in distribution-type arresters. It is able to withstand severe heating which accompanies heavy strokes of lightning. The "Granulon" is mixed with a special non-charring, inorganic, glass-like binder; then molded directly into the glass housing at high pressure to form a hard, dense mass with outstanding discharge capacity and valve-action properties.

Lens-shaped electrodes are placed in the valve element to counteract the lightning surge current "skin effect." These electrodes have been scientifically designed to produce a multiple-path distribution of the surge current throughout the valve element, thus increasing the discharge capacity of the element and assuring long, uniform life.

Assures High Capacity

The characteristics of L-M's valve element combine optimum performance features with outstanding protection and long arrester life. These characteristics are retained permanently without change caused by aging or service.

In addition, the "Isolator" provides positive assurance against permanent fault to ground by disconnecting the ground lead from the arrester if the arrester should ever become damaged.



1. The ladder spark gap is designed to provide a perfect balance between 60-cycle sparkover and impulse sparkover.

2. "Granulon," the valve material, is able to withstand severe heating which accompanies heavy strokes of lightning.

3. Lens-shaped electrodes in the element counteract "skin effect" of surges, assuring even distribution of the discharge throughout the valve element.

4. L-M's "Isolator" gives positive assurance against grounding feeders by disconnecting the ground lead from the arrester if the arrester should ever become damaged.

Electrical Characteristics of Type E Valve Arrester

KV Rating	Minimum Impulse Sparkover 1½x40 Wave KV Crest	Front of Wave Sparkover KV Crest	IR Drop Across Arrester				
			1500 Ampere Surge	3000 Ampere Surge	5000 Ampere Surge	10,000 Ampere Surge	20,000 Ampere Surge
1	8	8	4 KV	4.5 KV	5 KV	6 KV	7 KV
3	14	17	11 KV	13 KV	14 KV	16 KV	18 KV
6	30	33	22 KV	25 KV	27 KV	31 KV	35 KV
9	42	49	33 KV	37 KV	41 KV	46 KV	53 KV
10	42	49	37 KV	42 KV	46 KV	52 KV	59 KV
12	53	60	44 KV	49 KV	54 KV	60 KV	67 KV
15	63	70	55 KV	62 KV	66 KV	74 KV	85 KV

(On wave rising 100 kv per microsecond per 12 kv arrester rating; 10 kv per microsecond for 1 kv arrester.)

Get the whole story of L-M arrester performance and application. Ask the L-M Field Engineer, or write for a copy of Bulletin LA2, Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

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LINE MATERIAL Lightning Arresters

PEA Annual Meeting

(*Continued from page 43*)

today to faulty or inadequate education. Survey of a large high school group disclosed 67% in favor of more government regulation of business. Solution is to offer constructive knowledge of business to educators.

Oakes noted a growing understanding of the mutuality of interest between management and union members. But he urged management to provide employees the best possible standard of living, a chance to progress, good working conditions, and adequate information about the company's business.

Attention to National Problems . . . Other speakers weighed national problems. Among these were education, public opinion, and public power.

American business has a huge stake in education, said Dr T. A. Distler, Association of American Colleges. It benefits from the products of education and it should aid educational institutions in solving their problems, he said.

Complexion of the next Congress will influence power policies, warned J. C. Bevis, Opinion Research Corp. Maine's selection of a Democratic governor is the first real measure of opinion about the national administration, he said. Recent surveys show that 47% of the people now consider the Republican Administration better than the previous. But people are more critical about employment, living costs, taxes and the control of monopolies.

Bevis urged utilities to direct their appeal to the lower income groups and particularly the women. A program which gives these people more information about the companies which serve them will gain increased understanding and support, he said.

A plea for aid in the legal battle to outlaw government proposals to buy and re-sell power was voiced by R. L. Arnold, Southwestern Gas & Electric Co. Particular target is plan whereby Rural Electrification Administration finances generating plants for super co-ops, then Southwestern Power Administration contracts for their output to re-sell in competition with utilities. Failure to establish rates high enough to recover investment violates the Flood Control Act, Arnold contended.

Safety Awards . . . Safety record of 15 Pennsylvania utilities showed 15% improvement over the previous year, said R. R. Phillippe, chairman of PEA's Accident Prevention Committee. The frequency rate was 3.96 in 56 million manhours compared with the 1953 national record of 9, he said. PEA award for utilities working 2.5 million manhours went to Pennsylvania Electric Co for a 2.64 frequency rate. Runners up were Duquesne Light with a rate of 3.09 and West Penn Power with 3.14.

The award for companies working 350,000 to 2,499,999 manhours yearly was won by Northern Pennsylvania Power Co for its 2.28 rate. Pennsylvania Water & Power Co and Pennsylvania Power placed second and third, respectively. The award for smaller utilities went to Natrona Light & Power Co for its ninth perfect year. Runners up were Home Electric Co, also for a perfect year, and South Penn Power.

Citation for greatest improvement was given to West Penn Power among the large utilities. Northern Pennsylvania Power and Home Electric also won citations for improvement.

MEETINGS CALENDAR

CONTROLLERS INSTITUTE OF AMERICA
Annual Meeting, Edgewater Beach Hotel, Chicago, Oct. 10-13.

INTERSTATE POWER CLUB
Meetings will be held at Hotel Martinique, New York, Oct. 11, Dec. 6.

EDISON ELECTRIC INSTITUTE
Electrical Equipment Committee, Hotel Statler, Hartford, Conn., Oct. 11-12; Commercial Division General Committee Meeting, EEI Headquarters, New York, Oct. 15; Industrial Relations Committee in conjunction with North Central Electrical Association, Minneapolis, Minn., Nov. 18-19; Prime Movers Committee, Astor Hotel, New York, Nov. 29-30; Industrial Relations Committee, EEI Headquarters, New York, Dec. 16.

IOWA UTILITIES ASSOCIATION
Management Conference, Hotel Fort Des Moines, Des Moines, Oct. 11-12.

PENNSYLVANIA ELECTRIC ASSOCIATION
System Planning Committee, Lehigh Valley Club, Allentown, Pa., Oct. 11-12; Fall Meeting, Relay Committee, Hotel Alexander, Hagerstown, Md., Oct. 14-15; Fall Meeting, Electrical Equipment Committee, Hotel Robert Treat, Newark, N. J., Oct. 19-20; Fall Meeting, Communications Committee, Hotel Abraham Lincoln, Reading, Pa, Oct. 25-26; Fall Meeting, Transmission and Distribution Committee, Alexander Hotel, Hagerstown, Md., Nov. 4-5.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
Fall General Meeting, Morrison Hotel, Chicago, Oct. 11-15.

INTER-INDUSTRY FARM ELECTRIC UTILIZATION COUNCIL
Chairman, Fred H. Strong, REA Deputy Administrator. Meetings: Northeast Area, Deshler-Hilton Hotel, Columbus, Ohio, Oct. 12; Southwest Area, Texas Hotel, Fort Worth, Tex., Oct. 15; Southeast Area, Andrew Jackson Hotel, Nashville, Tenn., Oct. 20.

NATIONAL INDUSTRIAL CONFERENCE BOARD
Third Annual Conference on Atomic Energy in Industry, Hotel Commodore, New York, Oct. 13-15.

NATIONAL ASSOCIATION OF SUGGESTION SYSTEMS
12th Annual Convention, Drake Hotel, Chicago, Oct. 18-19.

NATIONAL SAFETY CONGRESS-EXPOSITION
Conrad Hilton Hotel, Chicago, Oct. 18-22.

ATOMIC INDUSTRIAL FORUM, INC
Meeting On "Atomic Opportunities in New England", in conjunction with New England Council, Statler Hotel, Boston, Oct. 20.

OKLAHOMA UTILITIES ASSOCIATION
Electric Light and Power Division, Western District Meeting, Duncan, Okla., Oct. 21; Eastern District Meeting., Ada, Okla., Oct. 22.

SOUTHEASTERN ELECTRIC EXCHANGE
Accounting Section, Roanoke Hotel, Roanoke, Va., Oct. 21-22; General Sales Conference, Roosevelt Hotel, New Orleans, La., Oct. 28-30; Accident Prevention Committee, Heidelberg Hotel, Baton Rouge, La., Nov. 11-12.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS
Symposium on Corrosion of Underground Structures sponsored jointly by NACE's Niagara Frontier Section and University of Buffalo at university's campus, Buffalo, N. Y., Oct. 27-28.

PUBLIC INFORMATION PROGRAM
Annual Workshop Conference, Chase and Park Plaza Hotels, St. Louis, Oct. 27-29; Mid-Atlantic Region, Hotel Statler, Washington, D. C., Nov. 12.

AMERICAN WELDING SOCIETY
National Fall Meeting, Sherman Hotel, Chicago, Nov. 1-5.

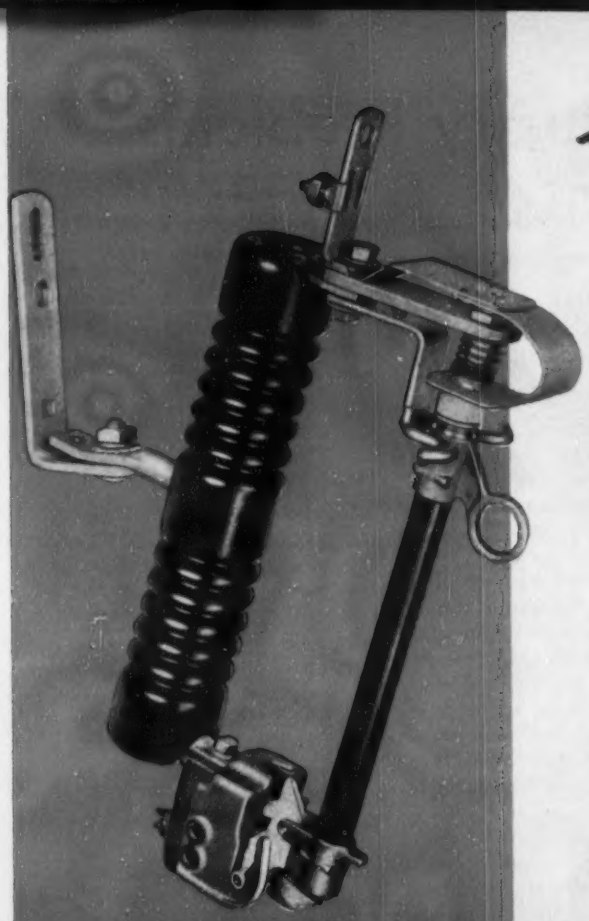
NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS
Annual Convention, La Salle Hotel, Chicago, Nov. 8-12.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
Annual Meeting, Haddon Hall Hotel, Atlantic City, Nov. 8-11; Winter Meeting, March 13-18, 1955.

AMERICAN STANDARDS ASSOCIATION
36th Annual Meeting and 5th National Conference on Standards, Hotel Roosevelt, New York, Nov 15-17.

WISCONSIN UTILITIES ASSOCIATION
Electric-Gas Sales and Engineering Convention, Schroeder Hotel, Milwaukee, Nov. 17-19.

(*Continued on page 60*)



New Easy Way to select cutouts

S&C's new XS Cutout carries short circuit interrupting ratings on a symmetrical basis, greatly simplifying calculations needed for cutout application. Predicated on known circuit characteristics, the symmetrical ratings match performance requirements at protection points.

Type XS Cutouts interrupt 4000 amp symmetrical (7.5 kv) and 3300 amp symmetrical (15 kv) at (1) sectionalizing points on distribution feeders, (2) distribution transformers, and (3) pole top capacitor banks . . . where the X/R ratio to the point of the fault is 4 or less. Cutout selection thus becomes direct and positive . . . conversion of fault currents from known symmetrical value to elaborately calculated asymmetrical values is no longer required.

Note that these ratings, which equal heavy-duty cutout performance, come at standard-duty cutout cost. It will pay you to obtain complete information on the Type XS Cutout contained in S&C's new Catalog Section 511.

Amperes, RMS		
Cutout Voltage Rating Kv	Asymmetrical Latest NEMA Std.	Symmetrical Alternate Suggested Std.
7.5	5000	4000
15	4000	3300

NEW SYMMETRICAL RATINGS SAVE TEDIOUS CALCULATIONS

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POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

Specialists in High-Voltage Circuit Interruption

RMEL Outlines Industry Problems

• Public relations, application research, distribution, obsolescence, and inadequate wiring are listed among the pressing matters by Fischer Black, EW publisher and editor

• Portland attorney tells convention the time is ripe for the industry to campaign for the repeal of the preference clause

Pressing industry problems and their solution were outlined before the 51st annual convention of the Rocky Mountain Electrical League at Estes Park, Colo., Sept. 12-15. The convention was urged by speakers to take positive action regarding the preference clause. Delegates were also given a preview of industry growth over the next decade, and told that inadequate wiring and inadequate selling are two obstacles to meeting prospective goals.

Now is the time for the industry to plan an active campaign for repeal of the preference clause. This call for action was voiced by Allen A. Smith, attorney, Laing, Gray & Smith, Portland, Ore. He said the preference clause appears to be the keystone of the arch of public ownership. Without the keystone, the arch may not fall, but its removal will be a tremendous setback.

The Big Problems

Public relations, application research, distribution, obsolescence, and inadequate wiring are among the pressing problems of the industry, according to Fischer Black, publisher and editor of Electrical World.

Individual companies should maintain a strong public relations division, he said. Long and short range plans must be evolved. The division must have adequate authority and top management support to carry on the job, he declared.

In the field of research, said Black, the utility industry has the dual job of researching the application of methods and equipment for system improvement while researching for better and expanded use of utilization equipment.

The distribution system is one area where long range plans made today will pay off in the future, he pointed out. Long range planning is prompted by forecasts that by 1970 residential and small commercial loads will be four times those of today. Expenditures can be minimized if future systems are planned and started today.

Inadequate wiring requires a bold, coordinated plan covering five to ten years and of sizable proportions, Black declared.

Existing customers offer the best prospects for load building in the future, said James T. Coatsworth, commercial director, Edison Electric Institute, New York. We must look more carefully at all classes of customers—homes, offices, factories—if more power is to be sold. And only aggressive action will meet the growing competition of L-P gas.

Six promotional programs for 1955, said Coatsworth, include bed coverings and electric housewares. However, there are ample activities, programs, and materials now available to proceed in all phases of load building, if only use will be made of them, he said.

Expense control, reported John T. Kimball, executive vice president, Arizona Public Service Co, Phoenix, is helping his company provide acceptable service at a price customers can afford to pay. He recommended that the industry take a closer look at expense control as a means of controlling costs. In his own company it resulted in the elimination of 20 clerical positions by consolidating and simplifying customer history files.

Importance of Education

The vital concept of individual initiative, as contrasted with the attitude of dependency upon others, must be established in the minds of the nation's young people. This should start in the schools, said R. G. Kenyon, vice president, Southern California Edison Co, Los Angeles, and be followed up by the business world. Our actions must overcome two fallacies held by the present generation—that progress is inevitable, and that a completely programmed life is possible.

Kenyon urged the electrical industry to appear more often on school campuses to meet with educators and offer them its help.

Use of the heat pump as an all-year weather conditioner in colder climates was foreseen by E. L. Robinson, general sales manager, Gulf States Utilities Co, Beaumont, Tex. Lower cost of heat pumps through greater production will help sell the cooling features.

Heat Pump Promotion

To promote this important type of utility load, Robinson listed several parts of a planned heat pump program: Sell units to employees at cost, with free wiring and installation; allow $300 toward the installation in a customer's home; have a heat pump on display in all company sales offices; and provide case studies of residential heat pump installations for personal contact with prospective customers.

There is no possibility that the industry will satisfy all demands for convenient, portable electric power, remarked Robert Stevenson, executive vice president, Allis-Chalmers Manufacturing Co, Milwaukee. However, he cautioned, the country's machine economy must be kept strong.

Market research is a valuable tool for the electrical industry to use in analyzing the types, needs and moods of its customers. How this tool may be used was described by Frank W. Mansfield, director of sales research, Sylvania, Inc, New York.

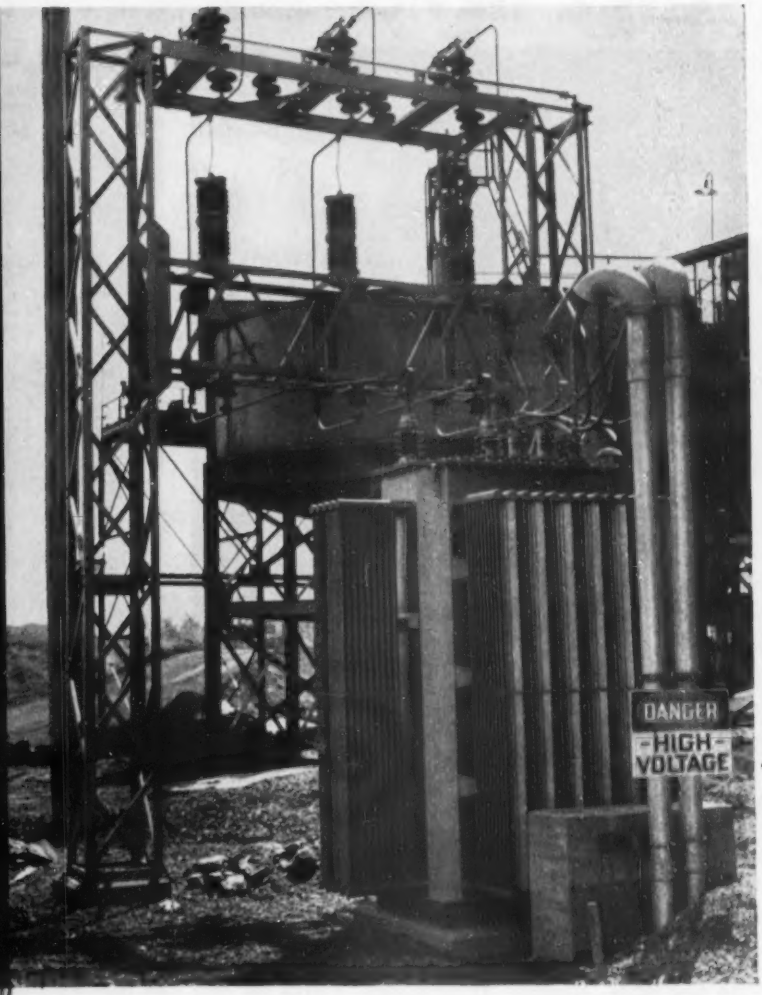
Expanded ACSR is expected to have a great future as an economical conductor for super-voltage systems, said Robert B. McKee, vice president, Aluminum Co of America, Pittsburgh. Alcoa, he continued, is moving toward developing aluminum as a conductor for the building wire field.

William V. O'Brien, vice president General Electric Co, New York, predicted that total energy sales will reach 908 billion kwhr in 1964, with 1,040 billion kwhr of total generation. By 1964, capacities of turbo-generators in service will be 450-500 Mw, with 1,000-Mw units on the drawing boards.

The next five years will see production of 428 million electric appliances, Roger Bolin, general advertising manager, Westinghouse Electric Corp, said. In the next decade, an average of six new appliances will be added per home.

Wagner®
TRANSFORMERS
...the choice of leaders in industry

POWER for a man-sized job...



Taconite is an important word in the Mesabi Iron Country. As the supply of rich ore becomes scarcer, the mining companies are prepared to process taconite and lower grade iron ore for delivery to the nation's steel mills.

Processing taconite is a man-sized job. It is one of the world's hardest ores. It has to be crushed and ground to separate the iron particles from the rock and silica.

During the winter, the temperature in the Mesabi country often drops to 30° below zero. Tough jobs under operating conditions like this call for a plentiful supply of really dependable power. At the Nashwauk, Minnesota, mine of The Cleveland-Cliffs Iron Company, this power is delivered by Wagner Transformers. Shown above is the 3000 kva Wagner Power Transformer that furnishes power for this plant, and at the left is one of the Wagner 1000 kva Unit Substation Transformers that supply plant loads.

Wagner can also furnish motors especially designed for use in taconite plants. Your nearby Wagner engineer can help you select the right transformers or motors for *your* needs. Call the nearest of our 32 branch offices, or write us.

Wagner Electric Corporation
EST. 1891

WAGNER ELECTRIC CORPORATION
6456 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

T54-12

BEFORE: Heavy, gloomy shadows and 8-ft-c illumination was all old indirect incandescent fixtures could deliver in a Rochester store

Sylvania Electric Products, Inc, Photo

AFTER: Illumination is increased nearly eight times. Goods now can be seen and new display areas are utilized to their full advantage

New Lights Boost Store's Display Space, Keep Sales Up

Edwards Department Store in Rochester, N. Y. is getting needed extra display space, not by building more shelves and cases but with light. A recently installed lighting system, by upping overall illumination nearly eight times, has made it possible for Edwards to display merchandise on table and countertops as well as in lighted showcases.

Goods gain color and sparkle out in the open beneath the new lights. Shadows are eliminated. Clerks say that before the new system was installed, they often had to walk a distance with merchandise to show it under proper light. Customers now call Edwards "a better place to shop." And to prove the point, since installation sales have held their own during what has been a soft business period.

New system consists of two-lamp slimline fluorescent fixtures arranged in 8-ft squares with 150-w incandescent downlights at each corner. Overall foot-candle level has been raised from 8 ft-c under the old system to more than 60 ft-c. Increase in operating cost has been very modest. Edwards is so pleased with the new installation (it now covers only the main floor and women's coat department) that it is planning to relight other parts of the store.

New England Co's Launch AW Finance Plan Tests

Residents throughout western New England soon may be able to finance new wiring on time if pilot tests now being put into action by three utilities in the area prove successful.

Boston Edison Co, Quincy Electric Light Co and Cambridge Electric Co all have such finance plans in the works and still other New England utilities are reported interested.

Quincy opened its campaign in mid-September with a meeting for contractors and members of the electric industry. Boston Edison, delayed a little by Hurricanes Carol and Edna, launched its campaign at the end of the month through ads in newspapers. Contractors also will tie in. Test plans at Cambridge are similar to those of the other utilities.

If the pilot operations are successful, they will be expanded to include all of the New England Electric System, of which Quincy is a part, and to Cambridge's other affiliates in the New England Gas & Electric Association. Still other New England utilities not in the tests may follow suit.

"Needless to say, finance plans are proving a real stimulant to adequate wiring," declared Norman Wicks, manager of the National Adequate Wiring Bureau. "These programs plus national advertising campaigns currently being conducted by several manufacturers are doing much to create a favorable climate for AW."

S & S Shorts

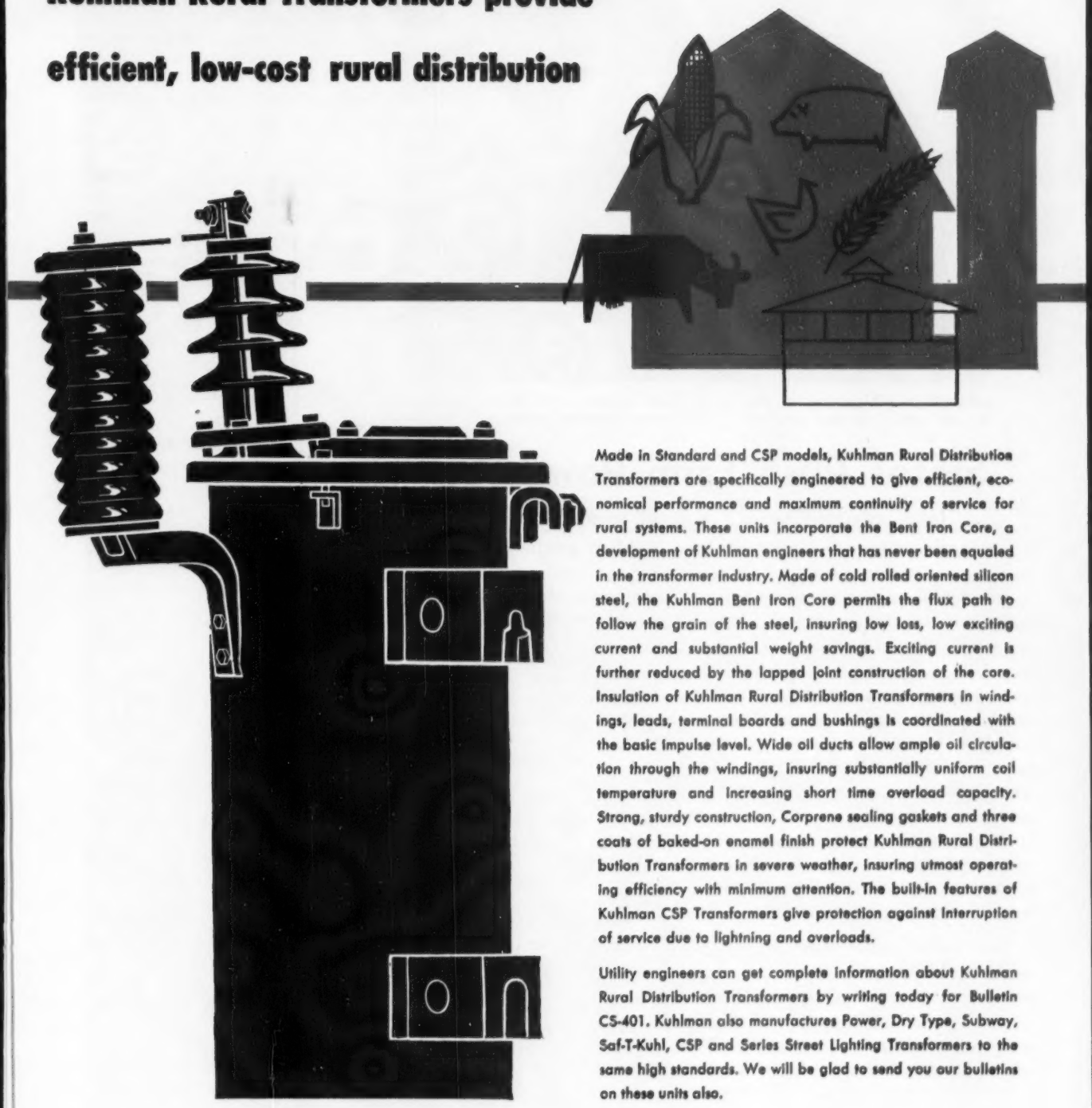
B&W Video Still Good

There will be as much black-and-white television receiver business as there will be color, at least for the next five years, Louis Hausman, vice president of CBS-Columbia, the television and radio receiver manufacturing division of the Columbia Broadcasting System, said this month.

Bank Finances Installation, Too

Bank of America, San Francisco, offers to finance the purchase of appliances plus $100 worth of 220-v wiring installation. Bank requires a down payment of 10%.

Kuhlman Rural Transformers provide efficient, low-cost rural distribution



Made in Standard and CSP models, Kuhlman Rural Distribution Transformers are specifically engineered to give efficient, economical performance and maximum continuity of service for rural systems. These units incorporate the Bent Iron Core, a development of Kuhlman engineers that has never been equaled in the transformer industry. Made of cold rolled oriented silicon steel, the Kuhlman Bent Iron Core permits the flux path to follow the grain of the steel, insuring low loss, low exciting current and substantial weight savings. Exciting current is further reduced by the lapped joint construction of the core. Insulation of Kuhlman Rural Distribution Transformers in windings, leads, terminal boards and bushings is coordinated with the basic impulse level. Wide oil ducts allow ample oil circulation through the windings, insuring substantially uniform coil temperature and increasing short time overload capacity. Strong, sturdy construction, Corprene sealing gaskets and three coats of baked-on enamel finish protect Kuhlman Rural Distribution Transformers in severe weather, insuring utmost operating efficiency with minimum attention. The built-in features of Kuhlman CSP Transformers give protection against interruption of service due to lightning and overloads.

Utility engineers can get complete information about Kuhlman Rural Distribution Transformers by writing today for Bulletin CS-401. Kuhlman also manufactures Power, Dry Type, Subway, Saf-T-Kuhl, CSP and Series Street Lighting Transformers to the same high standards. We will be glad to send you our bulletins on these units also.

143-T

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY

MINNESOTA DELEGATION at Inter-Industry Farm Council's first regional meeting in St. Paul met to lay plans for series of rural sales promotional meetings in its state.

States Push Farm Power Use

Inter-Industry Council's regional meetings set pattern for coordinated state-level rural load building programs

A new program to boost on-farm use of electricity is now in full swing following Inter-Industry Farm Electric Utilization Council's first regional meeting in St. Paul, Minn. Sept. 21 (EW, Aug. 23, p 96).

Delegates at the St. Paul meeting heard REA Chief Ancher Nelsen plug the Administration's "cooperation" theme as the key to greater farm use of electricity, to greater distribution of electrical equipment, and to greater efficiency and income for farmers.

Nelsen headed up the show, but for two days almost 600 delegates from the Dakotas, Minnesota, Iowa, Wisconsin and Illinois heard members of the Council plump for state-wide promotion campaigns.

Three new state organizations were set up and the activities of three others broadened to carry out the program. Newly-appointed committee members discussed old and new methods of attacking the problem. It will be up to them to work out the best local methods as time goes on.

First of Series . . . The six-state meeting was the first of a series of five throughout the country to push the program. The second was at Denver, Sept. 28. To follow are conferences at Columbus, Ohio, Oct. 12, Fort Worth, Oct. 15, and Nashville, Oct. 20.

One of the possible benefits to be gained through the series of meetings was expressed by R. E. Williams, commercial manager, Wisconsin-Michigan Power Co, who said: "I believe this committee, when formed, may be able to tie together the several promotional activities of existing statewide associations which are presently operating independently of each other and to formulate plans to bring more complete and useful electric service to Wisconsin farms."

Promise Full Cooperation . . . Representatives from all industries—power companies, equipment distributors, rural cooperatives, equipment makers—promised full cooperation. Stressing the REA stand on this, Nelsen said: "It will help everybody. It will help the power supplier who will sell more power; it will help the manufacturer, the distributor and the dealer who will sell more appliances and equipment; it will help the farmer who will be able to farm more efficiently and thereby increase his income; it will help raise the rural standard of living; and it will strengthen our national economy, the real purpose of the Rural Electrification Act."

C. V. Sorenson, vice president and general manager of Indiana & Michigan Electric Co and a member of the Inter-Industry Council, said this of the organization: "It can encourage intensified research, cooperate with extension agencies—from national down through state and county organizations—assist in experimental work, encourage sampling markets, and help coordinate equipment manufacturing and distribution systems as related to agricultural and farm markets."

Walter D. Hemker, Council member and spokesman for Westinghouse Electric Corp, told delegates the National Electrical Manufacturers Association has available for state groups participating in the campaign a variety of promotional material such as a "Go All-Electric" kit, combining sound slide film, folders for consumers and salesmen, advertising mats, and Agriculture Department statistics.

Own Few Household Items . . . G. Kyle Randall, USDA Agricultural Marketing Service, discussed the farm economic outlook from the standpoint of electric use. He saw a real opportunity for the equipment industry to help improve rural living standards, and cited census bureau figures showing that farm people own relatively few household items.

Fred H. Strong, Council chairman, conducted the two-day meeting.

Contest, Prizes to Aid El Paso Range Campaign

El Paso Electric Co is using contests, prizes and premiums to help push electric range sales during their 75-day Diamond Range Jubilee.

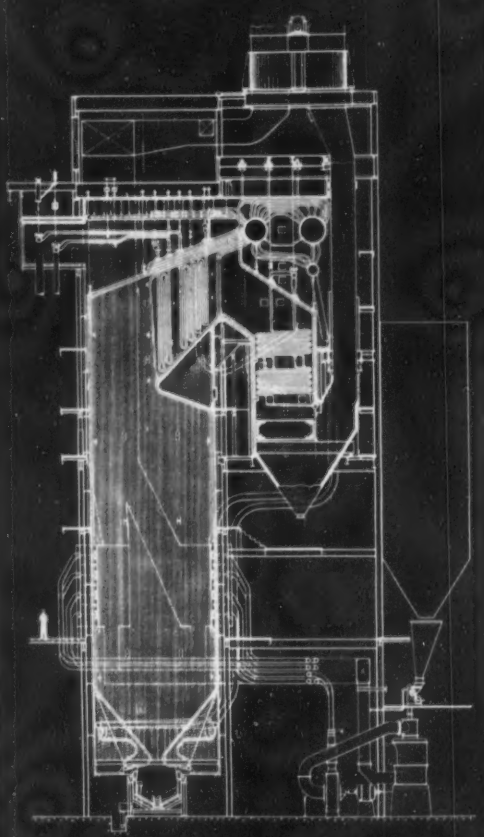
Two ranges will be given away during the campaign in a contest designed to build store traffic. One will go to the person best answering in 25 words or less, "I think the modern electric way is the best way to cook because . . ." The other will be awarded in a contest entry blank drawing.

Each person requesting an entry blank will receive a 150-w lamp bulb free, and a plastic apron upon returning the completed entry form. These premiums plus television and newspaper advertising, display materials and cash prizes are contributed by the utility. Participating dealers contribute $25 each for the two prize ranges.

To spur dealer salesmen, $50 will go to the man registering a contest winner and $50 to the one registering the most contestants.

Performance Record

Lee Steam Station
Duke Power Company



Among the first of the postwar, reheat units to be placed in service were those at the new Lee Steam Station of Duke Power Company.

There are two C-E Radiant Reheat Boilers each designed to serve a 90,000/100,000 kw turbine-generator operating at a throttle pressure of 1250 psi with steam temperature at 950 F, reheated to 950 F.

The most recently available full years performance record for the boilers – for the period Jan. 1 to Dec. 31, 1953 – show the following principal results:

AVAILABILITY *(In service or available. Not considered available while down for inspection or repair or while in process of starting up or shutting down.)*	98.38%
USE FACTOR *(Ratio of in-service hours to total hours.)*	96.71%
CAPACITY FACTOR *(Ratio of average hourly output – net kw – to nameplate capacity of turbine-generator.)*	102.70%

COMBUSTION ENGINEERING

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C-E

B-782

BOILERS, FUEL BURNING & RELATED EQUIPMENT; PULVERIZERS, AIR SEPARATORS & FLASH DRYING SYSTEMS; PRESSURE VESSELS; AUTOMATIC WATER HEATERS; SOIL PIPE

SAVE

$18.00 TO $85.64 PER 1000 FEET!

with Kaiser Aluminum Weatherproof Conductor

Simply by converting from copper to Kaiser Aluminum weatherproof conductor you save from $18.00 to $85.64 per 1000 feet in *material costs alone!* And there are *other* important potential savings!

Aluminum's light weight permits easier, faster stringing—cuts handling and installation costs. In addition, reduced strains on pole, homes and fittings greatly lower the cost of maintenance and repair.

You can be sure of getting the *maximum* savings possible with aluminum conductor by specifying Kaiser Aluminum. Experienced Kaiser Aluminum field engineers work with your crews right in the field where desired, demonstrate ways to speed installations and cut costs.

ACT NOW—as hundreds of power companies are doing! Convert to Kaiser Aluminum conductor easily, efficiently, economically—and save thousands of dollars a year. Complete field and engineering services at no obligation. Contact the Kaiser Aluminum sales office listed in your telephone directory or one of our many distributors. Kaiser Aluminum & Chemical Sales, Inc. *General Sales Office*, Palmolive Bldg., Chicago 11, Ill.; *Executive Office*, Kaiser Bldg., Oakland 12, California.

Kaiser Aluminum

THE NATION'S LARGEST PRODUCER OF TRIPLEX AND ALUMINUM WEATHERPROOF CONDUCTOR

Estimate your savings with these Kaiser Aluminum weatherproof conductors:

	Per 1000 Ft. Lbs.	Cost
#6 Solid Copper TBWP*	112	$ 44.50
#4 Solid Alum PE (2/64)	48	26.50
#4 Solid Alum Neo (3/64)	64	26.50
#2 7 Strand Copper TBWP*	270	107.00
1/0 7 Strand Alum PE (4/64)	141	69.60
1/0 7 Strand Alum Neo (4/64)	172	69.60
2/0 7 Strand Copper TBWP*	522	195.91
4/0 7 Strand Alum PE (4/64)	261	136.00
4/0 7 Strand Alum Neo (4/64)	306	136.00
4/0 7 Strand Copper TBWP*	800	298.64
336400 CM, 19 Str. Alum PE (4/64)	388	213.00
336400 CM, 19 Str. Alum Neo (5/64)	469	228.00

May 6, 1954 prices based on 30,000#—F.O.B. Destination
*URC Copper Triple Braid Weatherproof

INDUSTRIAL RELATIONS

EEI Labor Parley

Institute's round table conference features people and increased production

People and increased production keynoted the Seventh Annual Round Table Conference of the Edison Electric Institute's Industrial Relations Committee held in Chicago recently.

We must create and maintain conditions under which employees will produce the largest amount of good work, on a sustained basis, at the lowest possible cost, J. P. Flemming, Cleveland Electric Illuminating Co, declared. This, he said, will help to increase production and will "meet and beat our competition."

Thomas G. Ayers, Commonwealth Edison Co, urged members attending the conference to re-examine their company relationship to employees after their retirement. He said that a thorough examination of this activity may lead you to different programs than we now have.

Better Human Relations . . . Industrial relations departments, J. S. Gracy, Florida Power Corp, said "should be forever alert to all opportunities to assist and advise in the building of better and better human relations."

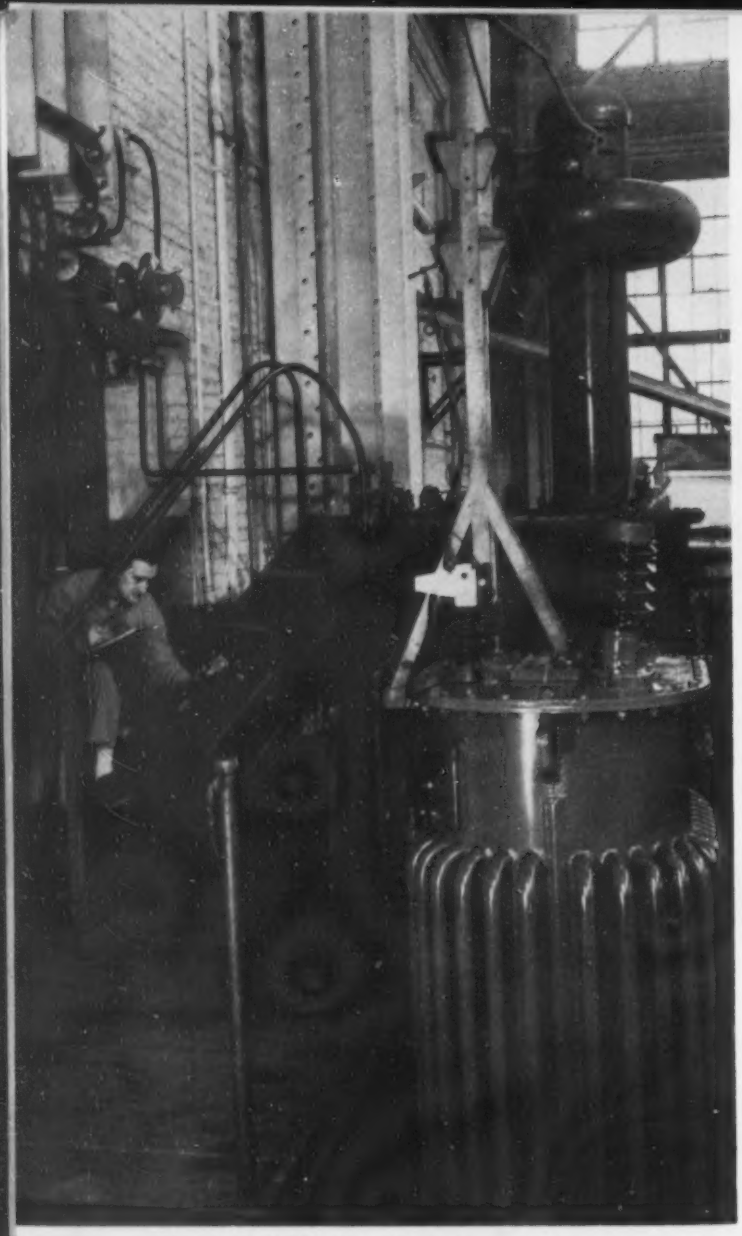
E. J. Brill, Pennsylvania Power & Light Co, pointed out that managements are taking a new look at the possibility of utilizing modern equipment and changed methods of operation to reduce operating costs. He said that methods must be in the "best interests of the employees, customers, and owners of the property."

The committee under the leadership of Donald A. Bartlett, Western Massachusetts Electric Co, set up a "Printed Material Display." Participants to the conference were able to look over the many hundreds of booklets submitted by the companies. If they desired copies, arrangements were made to send them to the participants.

At the luncheon meetings, the following spoke: James W. Parker, former president of Detroit Edison Co; Robert C. Simpson, manager of industrial relations department of Gilbert Associates, Inc; and S. King, president of Northern State Power Co.

Speakers discussing program are (l to r): Thomas Ayers, Commonwealth Edison; J. J. Brill, Pennsylvania P&L; J. S. Gracy, Florida Power Corp; and J. P. Flemming, Cleveland Electric;

Hazel Stevenson, Commonwealth Ed, shows J. M. McConnell, Rochester G&E, booklet. Checking on material: D. Rigo (l), Western Massachusetts Electric, E. Smith, Hartford Electric



TESTING TRANSFORMERS FOR RIV in the laboratory reveals defects that were not detected during the visual inspection or other tests

RADIO INTERFERENCE TESTS DETECT DEFECTS

Results help appraisal of equipment

R. H. MERTZ, Electrical Apparatus Engineer, Detroit Edison Co, Detroit, Mich.

Tests for radio interference voltage (RIV) on certain types of equipment helps Detroit Edison Co detect defects that are not visible. Both field and laboratory tests prove useful as radio interference, in many instances, is one of the early signs of equipment failure.

Field RIV tests are made to help locate faulty equipment on the system. Laboratory tests are made as a part of routine tests on new products or equipment of new design to determine whether they will be placed on the company's approved list of equipment to be purchased for a specified type of service. They are also made to determine whether equipment that has been removed will be returned to service. If a transformer or bushing has a high RIV value an attempt will be made to find the cause and remedy the trouble.

RIV measurements are a part of the regular tests made on 34.5- and 37-kv transformer and oil-circuit breaker bushings. Until recently they were also a part of the regular tests for transformers used on the subtransmission system. Now, available time determines whether the latter tests are made.

RIV measurements are also a part of the regular acceptance tests of insulators for use on overhead lines and station buses. They are made on samples at the time the insulators are being considered for purchase.

Modified RIV measurements are a part of the routine check up of distribution types of arresters.

Bushing Tests . . . Shop tests are made on new bushings and on old ones after any major rehabilitation. The RIV test is made along with other tests such as power factor, insulation resistance, and 60-cps over potential. This adds approximately two minutes to the former bushing testing time when the results are satisfactory.

Results of the final RIV readings on 34.5- and 37-kv compound-filled bushings for use on both transformer and oil circuit breakers are shown in Fig 1. Almost all of the bushings gave readings below 200 microvolts. Fig 2 gives results of the final readings on 34.5- and 37-kv oil-filled bushings. These bushings all gave readings below 200 microvolts.

Some of the causes of high RIV readings on bushings include:

1. Failure of the mounting hardware to make proper contact with the porcelain.

2. Lack of oil in an oil-filled type of bushing.

3. Strands of mica glass tape, used for the top layer of covering over the through lead of some dry-type bushings, extending into the air space between the conductor and porcelain shell. Noise was reduced by smoothing down the strands.

Tests on Transformers . . . The RIV test on transformers is made along with the regular test which includes winding resistance measurements, tests of winding insulation, phase sequence,

winding ratio, and core and copper loss. RIV test adds about 20 minutes to the former transformer test time. If the RIV measurments for a given transformer are much different from previous measurements of similar transformers an investigation is made to determine the reason for the difference.

RIV values for transformers, as measured in the laboratory just before the transformer is shipped to the field for installation, are shown in Fig 3. Most values will fall in one of two insulation classes, 23 kv and 34.5 kv. The curves indicate that 98% have an RIV value under 200 microvolts.

If test results are sufficiently high, the cause is investigated. Examples of causes of high readings are:

1. The transformer bushing through-lead. The high RIV can generally be reduced by applying additional layers of insulation such as varnished cambric tape.

2. High-voltage lead too close to the transformer core compression plates. The reading was reduced by placing fuller board between the lead and the compression plates.

On Insulators . . . The RIV data, along with other data such as 60-cycle and impulse flashover values, and thermal shock tests are considered in approving an individual type or model of insulator.

RIV values for representative insulators are:

- Pin-type insulators used on 24- and 40-kv systems, 100 microvolts with 31 to 38 kv impressed.
- Line-post insulators for the same service, 100 microvolts with 36 to 40 kv impressed.

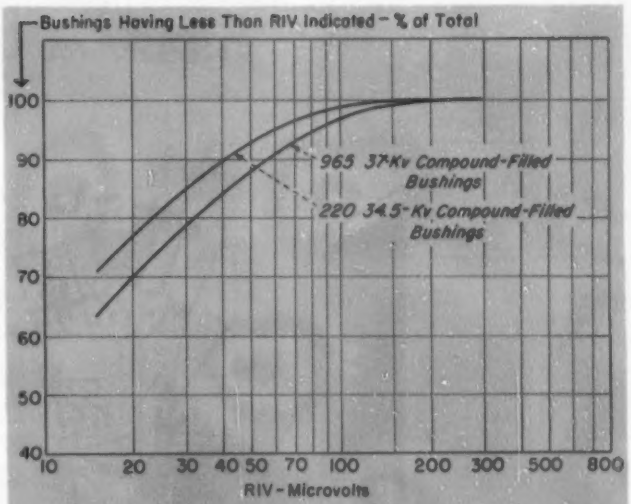
Arresters . . . A radio receiver is employed for the modified RIV measurements on used distribution arresters. The receiver is coupled to the test circuit by means of a capacitor and is equipped with a meter calibrated to read noise in terms of microvolts.

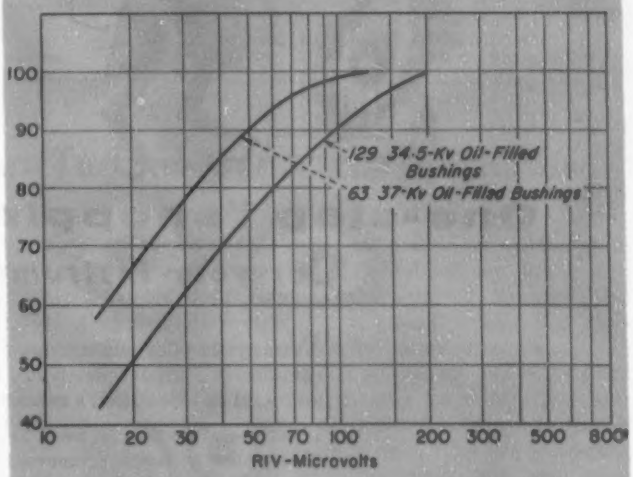
Very few arresters of modern design are discarded because of this test. If an arrester is in good condition, it will measure well under 100 microvolts, while if not in good condition the measurement will generally be well over 100 microvolts.

Field Tests . . . Radio patrol is a standard procedure on the company's overhead lines system. The patrolman is equipped with a modified radio receiver. He listens for interference as he follows the line by automobile. When the receiver picks up interference, some walking may be necessary to locate the trouble.

All subtransmission lines are patrolled each year. The radio patrolman also looks for visible signs of line trouble.

Conditions which commonly cause interference are burned insulator pins, defective insulators, loose connectors, loose tie wires, and contact of a conductor with tree branches.





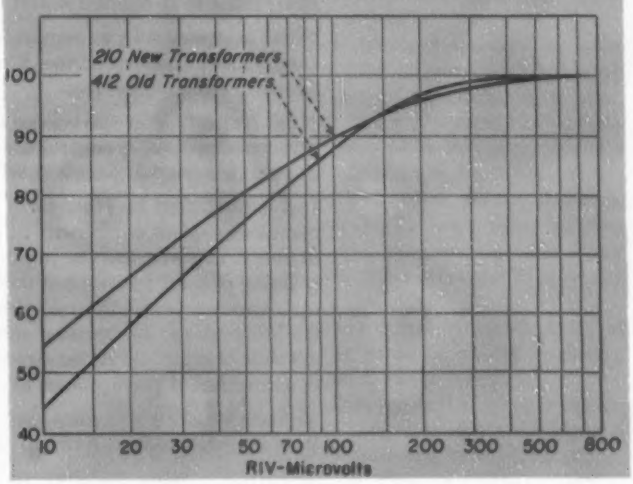


FIG 1—COMPOUND-FILLED BUSHING TESTS were all made at 26.4 kv and show that all units met the RIV requirements for field service

FIG 2—OIL-FILLED BUSHING TESTS for RIV were all made at 26.4 kv. The entire group of bushings has been approved for field service

FIG 3—RIV TESTS ON TRANSFORMERS were made at 15.2 kv for 24-kv service and 26.4 kv for 40-kv service. Results were satisfactory

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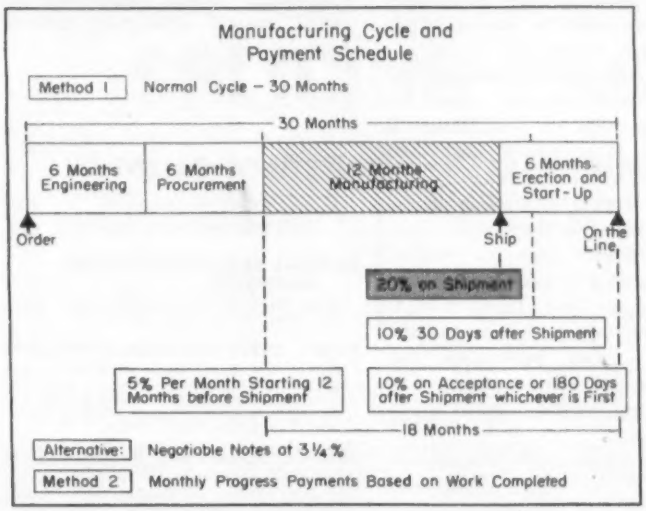
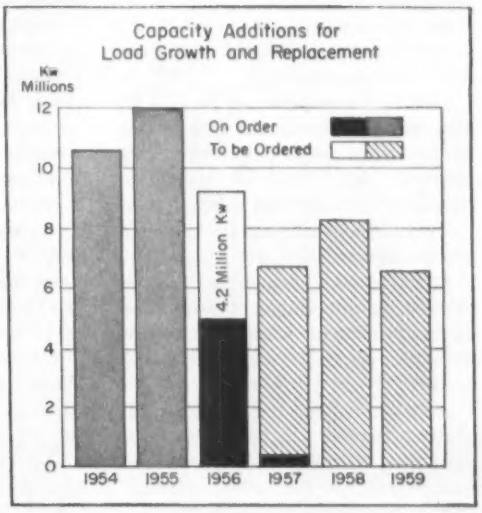
● REFERENCE DATA: FOR A QUICK LOOK AT THE COMPLETE HONEYWELL LINE, WRITE FOR COMPOSITE CATALOG NO. 5001





Westinghouse Program Spurs Turbine-Generator Purchases

A program has been launched by Westinghouse Electric Co urging electric utilities to order turbine-generators. It emphasizes that orderly production scheduling preserves the manufacturing facilities required and stabilizes the force of trained manpower to design and build them.

The program is designed to alert electric utilities to the serious problems that may result from the present low level of turbine-generator purchases. It emphasizes that utilities must buy now to meet the expected load increase predicted by the industry itself. The presentation also points out the disadvantages of "boom and bust" buying. It stresses the need for a balanced curve of purchases to enable the industry and its suppliers to meet obligations.

Eight major points were presented for a balance of production. They are:

- Electric utility industry predicts fantastic future load growth. Similar predictions in the past have always been exceeded.
- The industry reports that insufficient capacity is on order to meet this predicted load growth.
- Manufacturing capacity may be wasted and valuable people lost if unbalanced purchasing continues. The technology cannot advance as rapidly as needed under such conditions.
- Present construction cost trends are favorable.
- Equipment prices may rise—certainly no reduction is forecast—in the next several years.
- The cost of utility financing is down and should continue thus until another buying boom hits.
- Liberalized tax depreciation adds to savings.
- Manufacturing capacity is available to handle orders on a normal basis.

Thus, for those utilities who feel their future load pattern is right, there exist today unusual opportunities and strong justifications for plant expansion now.

Utility generating capacity statistics from the EEI Power Survey Committee Report are the basis for the above chart. It shows that equipment needed for installation in 1954 and 1955 is now scheduled for delivery. But in 1956 the factor of safe lead time disappears. . . . Since safe lead time for utility expansion is generally considered three years, it is already too late for normal scheduling.

The chart shows that 9.3 million kw will be required for installation in 1956, but only 5.1 million had been ordered as of September 21, 1954. It is too late to furnish the 4.2 million kw deficiency on a 30-month production schedule. Practically no commitments have been made for 1957 and none for 1958 and 1959.

If suppliers, according to Westinghouse, are to maintain orderly production schedules to permit delivery when the utilities need it, the time for scheduling is now. Otherwise, on the basis of present commitments, some manufacturing capacity is going to be idle in 1955 and a great deal of it in 1956.

If the manufacturing void is not filled, utilities' demands, according to EEI data, may well overtax manufacturing facilities in 1957 and 1958. And past experience has shown how unforeseen emergencies cause unexpected spurts in demand.

Balanced production means better service. Stability of scheduling will stabilize the force of skilled engineers, draftsmen and workers required in the industry.

The program points out that the period of open manufacturing capacity is closer than one might imagine. A high level of turbine activity must start soon. And utilities which order in advance of the trend can attain a flexible delivery schedule.

Typical normal time for building a turbine-generator is 30 months—six for engineering; six for procurement of materials; twelve for manufacturing; and six for erection and start up. The purchaser should plan his project by working back from the desired in-service date using this average production cycle.

Westinghouse will absorb all costs should cancellation

occur in the first four months of a 24-month delivery schedule. Cancellation after four months will be on the basis of payment of a reasonable charge to take care of the unrecoverable costs incurred.

During the engineering period, the customer can change the type of unit or its rating without incurring cancellation costs. However, it may be necessary to extend the shipping date.

Two methods of progress payments are available. They are:

1. Payments beginning twelve months before shipment with final 10% payment on acceptance or 180 days after shipment, whichever date is earlier.

An alternative to the monthly progress payments is negotiable notes upon presentation of each invoice, due and payable on the agreed shipment date and carrying 3.25% interest.

2. Monthly progress payments based on work completed.

The manufacturing time cycle and methods of payments are illustrated in an accompanying chart.

Marcus Transformer Is In Its New Plant

Marcus Transformer Co has completed transfer of manufacturing operations to a larger plant in Rahway, N. J. Situated on an 18 acre site, the new plant has 45,000 sq ft of floor area, over twice the area of the two former plants in Hillside, N. J.

Immediate plans include erection of another building of 10,000 sq ft minimum in about six months for additional manufacturing and storage facilities for dry type transformers.

August Primary Copper Output Lowest for Year

Domestic production of primary copper for September may be up slightly over August. Refinery output will be about the same or probably a little less than August, according to indications at press time. Fabricators are somewhat concerned that the current shortage of primary copper may force them eventually to curtail output.

Primary copper being in short supply has caused some nervousness over the outlook for the remainder of the year. Primary producers are hopeful for the "temporary" condition or man-made shortage to be cleared. On a long-range view the copper supply is reported to be ample.

August production of primary copper is reported to be the lowest for the eight months this year. Result is a reduction in producers' stocks and in deliveries to fabricators.

Primary copper production in the U. S., according to the Copper Institute, was 52,414 tons for August, down from 66,070 tons for July and 74,113 tons for June. Latter is highest 1954 monthly production to date.

Refined copper production was 103,901 tons for August, compared to 107,095 tons for July and 112,121 tons for June.

Copper deliveries to fabricators were 92,475 tons, 97,436 tons and 106,252 tons for August, July and June, respectively.

Producers stocks of refined copper were 58,387 tons in August. This is a drop of 10,534 tons from July and 11,794 tons from June.

Outside the U. S., primary copper production was 123,531 tons for August, a decrease of 6,987 tons from 130,518 tons in July. Deliveries to fabricators were 104,005 tons in August, down slightly from 105,281 in July. Producers refined stocks were 172,326 tons, up slightly from 170,558 tons in July.

Of four large producers, one has both primary and refinery production to almost normal; another has had work stoppage at about the same time at both its domestic and Chilean mines; two other producers have work stoppage at a smelter and a refinery. Chilean mines have started operation under a wage agreement giving workers a 26% pay rise, or about $9 million annually.

B&W Reactors

John W. Landis of the Babcock and Wilcox Co's Atomic Energy Division announced at an Atomic Industrial Forum Sept. 27 in New York City that within the next year his company will probably be prepared to quote firm prices on reactors of the following types:

1. Light water moderated and cooled, slightly or highly enriched uranium.

2. Heavy water moderated, light water cooled, natural or slightly enriched uranium.

3. Heavy water moderated and cooled, natural or slightly enriched uranium.

MEETINGS CALENDAR

(*Continued from page* 46)

NATIONAL FARM ELECTRIFICATION CONFERENCE

1954 Meeting, Van Curler Hotel, Schenectady, N. Y., Nov. 18-19.

PACIFIC COAST ELECTRICAL ASSOCIATION

Joint Fall Conference of PCEA's Administrative Service Section and Accounting Section of Pacific Coast Gas Association, Sir Francis Drake Hotel, San Francisco, Nov. 18-19.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Annual Meeting, Statler Hotel, New York, Nov. 28-Dec. 3.

PUBLIC UTILITIES ADVERTISING ASSOCIATION

Annual Meeting, Region 2, St. Moritz-on-the-Park, New York, Dec. 2-3.

21ST NATIONAL POWER SHOW

Sponsored by American Society of Mechanical Engineers, Commercial Museum, Philadelphia, Dec. 2-7.

EASTERN JOINT COMPUTER CONFERENCE-EXPOSITION

Sponsored jointly by American Institute of Electrical Engineers, Institute of Radio Engineers, and Association for Computing Machinery; Bellevue-Stratford Hotel, Philadelphia, Dec. 8-10.

LEGAL NOTICE

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SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION

Of Electrical World published weekly at Albany, New York for October 1, 1954.

1. The name and address of the publisher, editor, managing editor and business manager is: Publisher, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, N. Y.; Editor, Fischer S. Black, 330 West 42nd Street, New York 36, N. Y.; Managing editor, Daniel T. Braymer, 330 West 42nd Street, New York 36, N. Y.; Business manager, Otto A. Drechsel.

2. The owner is: McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, N. Y.; Stockholders holding 1% or more of stock: Donald C. McGraw and Willard F. Chevalier, Trustees for Harold W. McGraw, Donald C. McGraw and Elizabeth M. Stoltzfus, all of 330 West 42nd Street, New York 36, N. Y.; Donald C. McGraw and Harold W. McGraw, Trustees for Catherine M. Rock, 330 West 42nd Street, New York 36, N. Y.; Donald C. McGraw, Executor of the Estate of Curtis W. McGraw, 330 West 42nd Street, New York 36, N. Y.; Donald C. McGraw, 330 West 42nd Street, New York 36, N. Y.; Mildred W. McGraw, Madison, New Jersey; Grace W. Mehren, 536 Arenas Street, LaJolla, California; Touchstone & Company, c/o Wellington Fund, Inc., Claymont, Del.

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4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: 23,574.

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By J. A. GERARDI, Vice Pres. & Treas.

Sworn to and subscribed before me this 14th day of September, 1954.

[SEAL] ELVA G. MASLIN.
(My Commission expires March 30, 1956)

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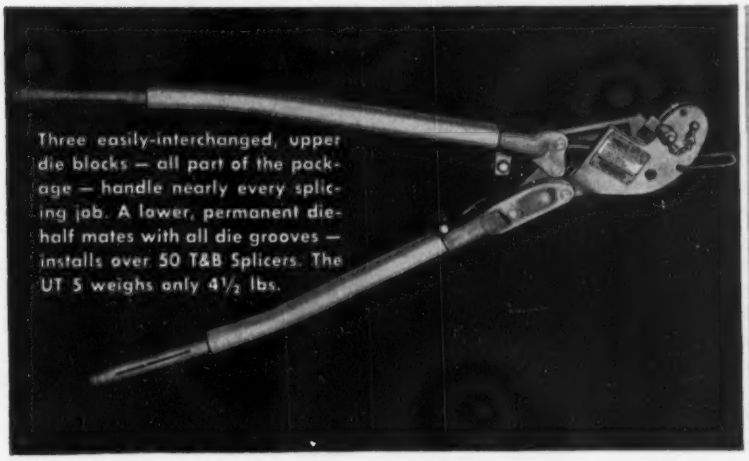

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Atomic Power Development

Investment and insurance groups are casting a cautious look before leaping into this important field

Investor and insurance groups are taking a cautious look before leaping into the atomic power development field.

Representative views from these two groups put before the Atomic Industrial Forum meeting in New York in late September boiled down to this: While both the investment banker and the insurance agency feel a responsibilty to lend a hand to the industrial development of atomic energy, new attitudes and new methods must be developed to meet problems of the atomic era.

No Plethora of Investment Bonanzas . . . Armand G. Erpf of the Carl M. Loeb, Rhoades Co, an investment firm, told forum members that a study of atomic power prospects "does not disclose a plethora of investment bonanzas."

Erpf urged nuclear scientists to stress the time element in discussing the possible future applications of atomic energy, ". . . let him say ten or twenty years instead of tomorrow." He continued, "A quarter of a century may only be a moment in history but it is a long time in the life of the investor."

The investment expert noted that the electric utility industry is expanding rapidly using conventional equipment and added, "with the exception of a few outlying areas in the United States, atomic fuel is not likely importantly to stimulate its immediate growth."

Writing insurance for the privately-owned atomic power plants presents even tougher problems. While investors are already speculating on various phases of atomic power development, insurance companies have yet to write a policy. Until now, the risks of atomic development have all been assumed by the federal government, and this is likely to continue for some time.

Underwriters have studied these problems, but have yet to come up with concrete proposals.

Three Point Program . . . S. Bruce Black, president of Liberty Mutual Insurance Co, suggested to the forum a three point program for approaching the insurance problem:

1. Persons with a stake in the coming atomic power industry should form a committee to decide the kind of insurance needed and the maximum risks to be covered.

2. The insurance industry, through a cooperative group, should seek methods of developing the insurance needed and amassing the maximum capital to cover these risks. One objective would be to spread these risks as widely as possible among underwriters.

3. Problem then would be to discuss the gap, if one exists, between the maximum policies needed by industry and the maximum risks which could be assumed by the underwriters. If the gap loomed large, some federal help might be required.

Black emphasized that insurance of this type must pay its own way. Insurance companies cannot properly lean on reserves accumulated for other risks to underwrite the hazards of the new atomic power industry, he said.

Stuart MacMackin, counsel, Atomic Products Division of General Electric Co, said he expected "a miracle" from the insurance industry in providing coverage for atomic power development.

The GE lawyer said insurance is necessary if the new industry is to go forward. He listed these specific reasons for looking to underwriters to assume part or all of the risk: (1) The magnitude of possible atomic catastrophe is such that liabilities could easily exceed the assets of any corporation which was found to be the legal cause of the mishap; (2) insurance is an efficient and desirable method of spreading the risk; (3) industry needs the policing and safety advice which it has come to expect from the insurance industry.

George L. Weil, an atomic power consultant, said nuclear reactors "can be exceedingly hazardous—much more so than any other industrial operation with which we are familiar." But, he said, safeguards must be provided to give positive assurance that the maximum possible accident just cannot happen.

These safeguards are certain to be costly, he added.

Asks Divorcement of HESCo

A Honolulu appliance dealer is starting a stockholder's action against Hawaiian Electric Co to try to force it into a complete divorce from its wholly owned subsidiary, Hawaiian Electric Supply Co, which handles appliances.

W. L. Nylen Jr, who operates Nylen Brothers, an appliance firm, asserts that HESCo operates under "the protective wing" of the utility and has been "carried" by the parent company which has an assured income from utility operations.

Nylen, who recently bought three shares of stock in HECo, sent a letter to the firm's 3,500 stockholders asking their proxies to vote for a divorce at the next stockholder meeting.

Pres Leslie A. Hicks of the utility has issued a detailed reply, calling Nylen's arguments "misleading, valueless, and unsound."

Nylen said the supply company operations reduced the return to HECo stockholders; Hicks said they increased it.

Nylen said a divorce from the supply company might reduce the need for a rate increase now sought by the utility; Hicks said it might have the reverse effect through loss of a strong effort to increase the use of electricity.

Nylen said he would readily admit that his own firm stands to profit if the supply company is divorced by HECo but said that doesn't alter his basic arguments that continuance of the company is against the interest of HECo stockholders.

California-Oregon Power Will Sell 120-Kv Line

Oregon Public Utilities Commissioner Charles H. Heltzel has approved sale of a 20-mile section of 120-kv transmission line of California-Oregon Power Co to the Bonneville Power Administration. Price tag was $249,979.61.

The section is a segment of the company's Dixonville-Roseburg-McKinley No. 20 line in the Douglas-Coos counties area of southwestern Oregon. Bonneville, which purchased the eastern section of the same line last year, reported plans to rehabilitate the line and increase its capacity. Later BPA expects to connect the line to another to be built from Eugene to Reston.

Heltzel signed the order on Sept. 17. Federal Power Commission approval is now being sought.

FINANCIAL BRIEFS

St. Joseph Light & Power Co is planning to sell privately $2 million of 3½% sinking fund debentures due 1979 . . . **Southern Nevada Power Co** has sold $2.2 million in first mortgage bonds and sinking fund debentures to three insurance companies. The balance of the $6.4 million ($5.4 million of sinking fund first mortgage bonds and $1 million of sinking fund debentures) under the present financing arrangements will be drawn as needed during 1955. The company expects to raise about $700,000 through the sale of common stock.

Power Corp of Canada has sold 120,000 shares of 4½% cumulative redeemable $50 par first preferred stock . . . **Hydro-Electric Power Commission of Ontario** has sold $50 million 3½% debentures due 1979 to a syndicate headed by McLeod, Young, Weir & Co which is offering the bonds to the public at par.

Iowa Public Service Co stockholders will be asked to approve a 100% stock dividend at a special meeting to be held Nov. 19. The proposal calls for changing each share of $5 par common stock into two shares of $5 par common which will increase the outstanding shares to 2,702,208 from 1,351,104.

Today in Utility Finance

YIELDS (%)

Quality	Bonds 1st	Bonds 2nd	Bonds 3rd	Preferred Stocks 1st	Preferred Stocks 2nd	Preferred Stocks 3rd	Common Stocks 1st	Common Stocks 2nd	Common Stocks 3rd
DATE									
Sept. 30	**2.88**	**2.96**	**3.10**	**3.89**	**3.99**	**4.38**	**4.50**	**4.80**	**5.19**
Sept. 23	2.88	2.91	3.10	3.90	4.02	4.39	4.48	4.77	5.15
END OF QTR.									
2nd 1954	2.90	2.96	3.19	4.03	4.14	4.48	4.72	5.04	5.45
1st 1954	2.82	2.87	3.14	3.88	4.09	4.42	4.83	5.19	5.42
4th 1953	3.07	3.12	3.34	4.17	4.32	4.62	5.07	5.57	5.51
3rd 1953	3.30	3.33	3.54	4.35	4.52	4.83	5.36	5.57	6.01

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months Ended		Net Income 1954	Net Income 1953	Earnings Per Common Share 1954	Earnings Per Common Share 1953
Alabama Power	12	Aug.	$13,351,381	$12,546,018	$	$
Consumers Power	12	Aug.	26,062,293	22,981,984	3.04(a)	2.89(a)
Detroit Edison	12	Aug.	21,147,546	20,522,465	1.96(b)	1.93(b)
Georgia Power	12	Aug.	13,297,950	12,301,727		
Gulf Power	12	Aug.	2,197,208	2,032,016		
Iowa Southern Utilities	12	Aug.	1,163,011	1,374,436	1.39(c)	1.96(c)
Kansas City Power & Light	12	Aug.	6,744,223	6,389,944	2.21(f)	2.36(f)
Mississippi Power	12	Aug.	2,151,764	2,319,953		
Ohio Edison, consolidated	12	Aug.	19,797,281	18,279,965	2.94(g)	2.99(g)
Southern California Edison	12	Aug.	25,248,501			
Southern Co. consolidated	12	Aug.	22,779,362	21,671,067	1.25(h)	1.19(h)
Southern Indiana Gas & Electric	12	Aug.	2,307,207	2,112,051	2.07(i)	2.13(i)
Texas Electric Service	12	Aug.	9,925,185	8,813,354		
Virginia Electric & Power	12	Aug.	15,128,610	12,454,505	2.14(j)	1.87(j)

Notes—(a) Based on 7,473,798 shares in 1954 and 6,794,362 shares in 1953; (b) Based on 10,780,158 shares in 1954 and 10,617,883 shares in 1953; (c) Based on 744,531 shares in 1954 and 626,113 shares in 1953; (f) Based on 2,450,000 shares in 1954 and 2,224,540 shares in 1953; (g) Based on 5,806,136 shares in 1954 and 5,278,306 shares in 1953; (h) Based on 18,087,643 shares in 1954 and 1953; (i) Based on 913,333 shares in 1954 and 799,167 shares in 1953; and (j) Based on 5,999,980 shares in 1954 and 5,441,034 shares in 1953.

FINANCING

Company and Description	Amount of Offering ($000)	Offering Price	Yield to Public / Bid Date
WEEK OF SEPTEMBER 30–OCTOBER 6			
Bonds			
Denton, Tex.—electric revenues due 1955–84	$4,300	various	1.00–3.00%
Public Service Co of Colorado—1st mtg 3⅛% due 1984	20,000	101.75%	3.035
Wisconsin Power & Light—1st mtg 3¼% due 1984	18,000	102.60	3.12
Indiana & Michigan Electric—1st mtg 3⅛% due 1984	16,500	101.665	3.04
Metropolitan Edison—1st mtg 3⅛% due 1984	15,000	101.75	3.035
Preferred Stock			
Indiana & Michigan Electric—40,000 sh 4.12% $100 par	84,000	101.728	4.05%
Common Stock			
Sierra Pacific Power—34,807 sh (being offered commonholders on a 1-for-10 basis and preferred holders on a 1-for-5 basis, record Oct. 5 to expire Oct. 22)	$1,114	$32.00	6.25%
SCHEDULED FOR OCTOBER–NOVEMBER			
Bonds and Debentures			**Bid Date**
Cleveland, Ohio—electric revenues due 1959–78	$5,000		Oct. 7
Eugene, Ore.—water and electric utility due 1959–78	1,000		Oct. 11
Savannah Electric & Power—1st mtg due 1984	5,000		Oct. 13
Savannah Electric & Power—debs due 1979	3,000		Oct. 13
Wisconsin Public Service—1st mtg due 1984	12,500		Oct. 14
Texas Power & Light—1st mtg due 1984	20,000		Oct. 18
Louisiana Power & Light—1st mtg due 1984	18,000		Oct. 20
Florida Power Corp—1st mtg due 1984	12,000		Oct. 26
Florida Power & Light—1st mtg due 1984	10,000		Oct. 27
Sierra Pacific Power—1st mtg due 1984	4,000		Nov. 9
Wisconsin-Michigan Power—1st mtg due 1984	3,000		
Kansas Power & Light—1st mtg due 1984	8,000		
Central Louisiana Electric—conv debs due 1964 (being offered to common stockholders record Oct 4 on the rate of $100 deb for each 27 common shs held of record Oct 4)	3,772		
Preferred Stock			
Mississippi Power & Light—44,476 sh $100 par (to be offered in exchange for outstanding $6 pfd on a sh-for-sh basis, plus a cash difference between initial public offering price of new shares and redemption of the old shares; offer will expire Oct 28)			Oct. 13
Savannah Electric & Power—30,000 sh $100 par	3,000		Oct. 13
Common Stock			
Hawaiian Electric—50,000 sh (to be offered commonholders on a 1-for-13 basis)			
Virginia Electric & Power—600,000 sh (to be offered commonholders on 1-for-10 basis)			
ISSUES RECENTLY POSTPONED			
Bonds			
Gulf States Utilities—1st mtg due 1984	$24,000		
Consolidated Edison Co of N.Y.—1st mtg due 1984	50,000		
Preferred Stock			
Gulf States Utilities—160,000 sh $100 par	$16,000		

California PUC Grants Hike . . .

. . . of $90,367 a year in rates to California Electric Power Co. This is part of $1,330,000 a year requested by company

The California Public Utilities Commission has granted the California Electric Power Co an interim rate increase of $90,367 a year in an area where it is in competition with the Southern California Edison Co. The preliminary order is dated Sept. 3. It is part of a proceeding before the PUC to increase the rates of the company by $1,330,000 annually.

The opinion said in part: "On Aug. 25, 1954, applicant filed a petition requesting authority to place into effect increased rates as set out in said petition within the corporate limits of the City of San Bernardino and adjacent territory.

"In support of its petition, applicant shows that on Aug. 17, 1954, this commission entered its order in Decision No 50449 in the matter of the Southern California Edison Co, Application No 33952, thereby fixing various schedules of rates for said Edison company's electric service in the City of San Bernardino and adjacent territory where the Edison company and applicant are in competition, said schedules being further identified as D-3, H, P-1, A-3, and A-7.

Rate Schedules

"Attached to the petition are applicant's proposed schedules of rates for various classes of service in said competitive territory identical with said schedules of Edison company, except that whereas Edison's Schedule D-3 provides a metered kilowatthour charge for water heating, applicant offers an optional flat rate for water heating under its present Schedule DWH, which schedule is not included in this filing.

"Applicant's proposed schedules are designated as D-1, H-1, P-1-C, P-1-D, A-4, and A-5. Applicant requests that said schedules be made effective as to service furnished on and after Sept. 13, 1954, the date when Edison's increased rates become effective. The annual increase in revenue to result from the proposed filing of the aforesaid schedules is estimated by applicant to be $90,367.

"Petitioner alleges that it desires to continue its present practice of maintaining rates equal to those of the Edison company for all classes of service in the competitive territory within the corporate limits of San Bernardino and certain adjacent territory.

System-Wide Rates

"The commission, in its order in Decision No. 46397, dated Nov. 6, 1951, on California Electric Power Co's Application No 32188 for increased system-wide rates, stated as follows (51 CPUC 189, 207): 'If applicant decides not to make such revisions in its Schedules D-1, L-1, H-1, P-1-C, and P-1-D, which are presently applicable within the city limits of San Bernardino, it shall retain in effect the present rates and charges of said tariffs.' Applicant did not elect to make such increases effective in San Bernardino within the time limit imposed by such order and has thus maintained its rates at the then effective level of Edison's rates.

"It is recognized that applicant's rates in San Bernardino have been unduly depressed, as compared with its other rates, for a period of years in view of the competitive condition there existing. Now that the commission has authorized higher rates in the territory served by the Edison company within San Bernardino it appears to be in the public interest that applicant's petition be granted. The rates authorized herein in the main are somewhat higher, while some are lower, than the level authorized in 1951 by said Decision No 46397 and differ somewhat in form. In order to assume uniformity of application and charges to petitioner's and Edison's customers, the new rates will maintain parity of rate levels on the two utilities.

"We hereby find that the increases in rates authorized herein are justified."

The commission ordered that on not less than two days notice both to itself and to the public, the new schedule of electric rates is to become effective on and after Sept. 13, 1954.

Vepco Rate Boost Up to Court of Appeals

Virginia State Corporation Commission announced recently that higher rates it granted for Virginia customers of the Virginia Electric & Power Co will stand as approved, unless upset by the State Supreme Court of Appeals.

A joint announcement by the three commissioners said that on the basis of a consulting engineering firm's study, which they made public, "there is nothing further to be done in the case."

Increased rates for Virginia customers of Vepco, which went into effect last March 1, are designed to produce about $4.8 million in additional annual gross revenue for the company.

Arlington County, which had objected to the increases, has appealed to the State Supreme Court of Appeals from the SCC action allowing the boosts. Arguments in the case are scheduled to be heard by the high state court this fall.

After a brief conference with attorneys for groups objecting to the rate change, SCC Chairman Ralph T. Catterall and Commissioners H. Lester Hooker and W. Marshall King said their decision in the case is final, unless reversed by the court.

The engineering study, which had been ordered by the commission, was made by Ebasco Services, Inc, of New York. Its detailed analysis of the company's rate schedules supported the commission's finding that the higher rates were justified.

Ebasco's report to the PSC showed that residential subscribers are paying 43.2% of Vepco's income; small commercial, 24.5%; large commercial, 23.1%, industrial plants, 3.5%; ice plants, .4%; and other customers of the company, 5.3%.

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Ready to serve you is Locke's highly trained field service organization. It is the insulator industry's most competent factory-employed nation-wide technical service group. Call upon us freely . . . for help on any insulation problem . . . routine or emergency.

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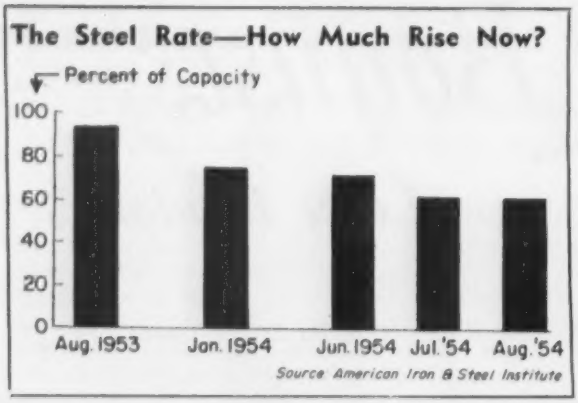
ELECTRICAL BUSINESS OUTLOOK



Steel Industry: Begins Its Fall Upturn

The steel industry is beginning its fall upturn. The size of this upturn will be one of the key indicators to watch in gauging the level of business this fall and winter.

What's the evidence that steel is picking up? One item is concrete: The steel production rate has actually risen from the low point of about 62% of capacity to the upper sixties. This rise seems to mark the end of the long decline in steel production (See chart).

First Real Pickup . . . Another sign is just talk—but important talk. A good many steelmen report that their orders actually picked up in September. Some say it's the first real pickup they have had all year. And another sign is the price of steel scrap, usually a good indicator of steel conditions. It's just reached the highest point of the year in Pittsburgh.

The steel production rate is doubly important this year because it reflects two key economic facts. One, obviously, is the level of general business. The other is the rate of inventory changes in business.

Steel has borne a major share of the burden of the current inventory adjustment in the United States. Manufacturers have been cutting inventories for about a year. They reduced them by about $3 billion between August, 1953, and August, 1954. And a good portion of the inventories that were worked off were steel. While industry worked off its supplies of steel products, the steel industry had to cut back production.

How much upturn will there be this fall? The answer depends, of course, on what happens to manufacturers' inventories. As long as other industries are still cutting inventories of steel, the rate won't go much above 70% of capacity. But if steel production gets into the upper seventies, that will indicate that the long inventory adjustment in this area is over. And that would be a good sign for the economy as a whole, since inventory cutting has played a key part in the current recession.

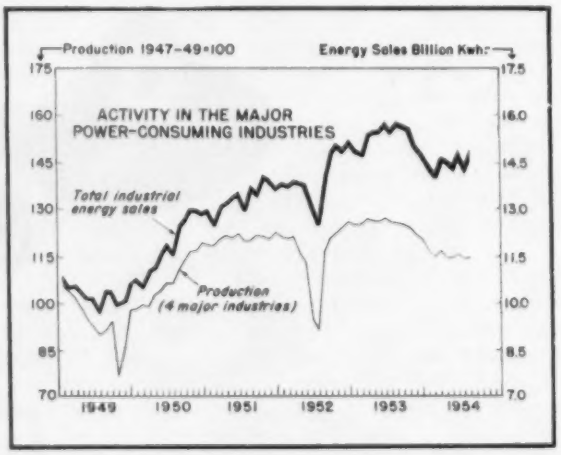
The chances are that the steel rate won't go above 80% this fall, unless there's a real upturn in the economy in general. It's likely to run at about 75% of capacity through most of the fourth quarter, with minor ups and downs. Anything better would be a very good economic sign—anything lower would indicate either that inventories are still big, or that the economy is slipping again.

It's hard to exaggerate the importance of the steel industry in the American economy. More than 600,000 people are employed in blast furnaces, steel mills and rolling mills in a good year. And hundreds of thousands of others work in foundries, iron and coal mines and transportation industries working directly for the steel mills.

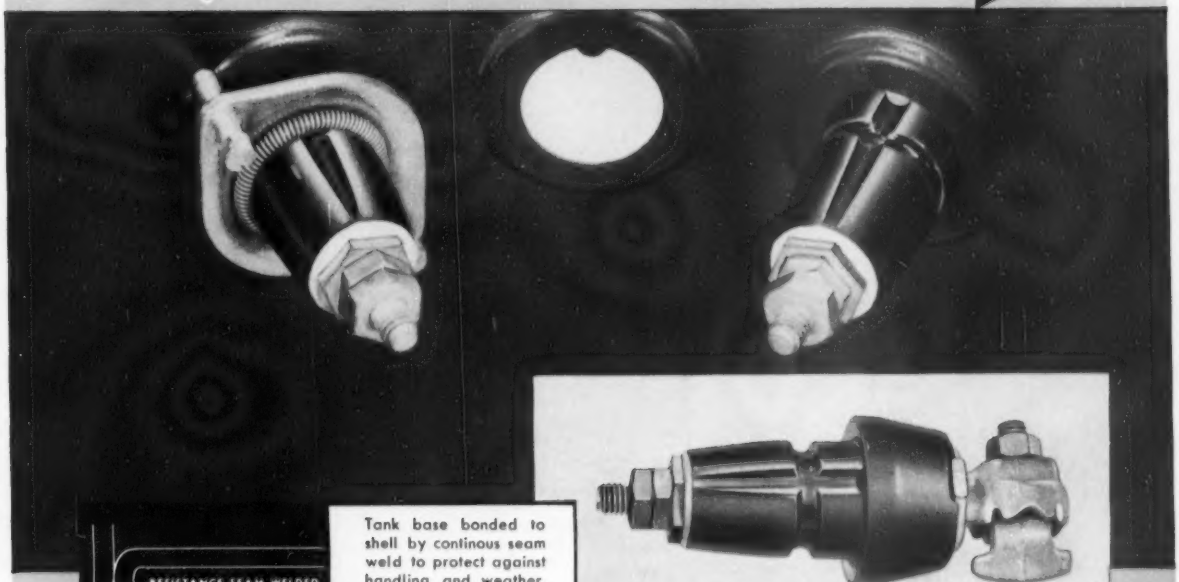
Good times for the steel industry generally reflect good times for the economy—and *vice versa.* And this year, times have not been as good as the industry has come to expect (See chart). The rate of steel production has been running far below the rate of recent years, even allowing for the change in total capacity.

Steel Cutback Affects Entire Economy . . . The consequences of this cutback have affected the entire economy. Not only do steelworkers get lower incomes—or no incomes, in some cases. In addition, railroads cut back, ore boats are laid up as piles of unused ore grow, coal mining slows down. Industrial power sales drop—the steel industry used more than 30 billion kwhr last year. And all the towns where these activities are important begin to slow down—as many a politician is aware at this time of year.

The effect of declining steel production on capital spending by the industry is clear. Steel companies are among the heaviest spenders for new plants and equipment. They planned to invest more than $1.1 billion in plant and equipment this year. But, according to the latest report, they now expect to spend only about $890 million.

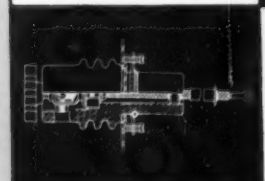


KEY TO SAFETY



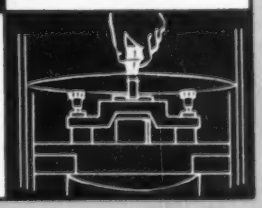
Tank base bonded to shell by continous seam weld to protect against handling and weather. Inside edge coated with sealing mastic and rolled in to form lasting barrier against moisture, air and rust.

Corprene gasket retained by ring welded to tank cover. Gasket is retained in position forming a perfect tank seal. Gasket is not cemented and can be used again and again.



Moloney sidewall mounted high voltage bushings are provided with a molded, high impact resistant phenolic-cold rubber protective cap for working "hot".

Tap changer operating handle located above hot oil level. Double-moving contacts snap into position with a wiping action to assure positive contact.



Key and slot mounting of Moloney HiperCore Transformer *low voltage* bushings literally locks them to safety . . . gives your linemen solid leverage for tools. These bushings can't slip or turn under torque. Safety is inherent, too, in the sidewall mountings that permit either above or below vertical take off. The solderless type terminals accommodate all ASA standard conductor sizes.

Made of high-strength, dry-process porcelain, the bushings meet utility requirements. Moloney HiperCore Transformer bushings are designed to function under any operating conditions.

Specify Moloney HiperCore Transformers and give your distribution system dependability . . . the mark of Moloney for 58 years.

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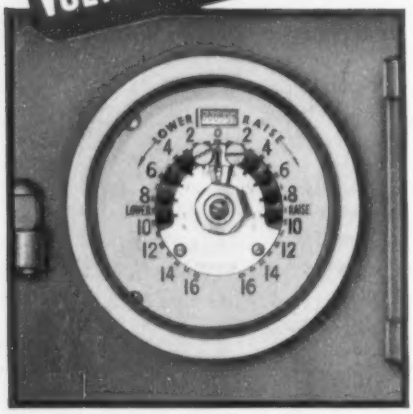
5/8% STEP
VOLTAGE REGULATORS



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2 Place Limit Switch Pins in Desired Positions

3 Close Window

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Five Ratings in a Single Regulator

In addition to simplifying operation, the *Vari-Amp* feature provides five ratings in a single regulator. You can meet regulation requirements at less expense in most cases. When loads grow, changes cost less because range of regulation can be reduced proportionately instead of being cut in half as with other regulators. Extra short-circuit capacity is available, too.

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